

The **MINING CONGRESS JOURNAL**

Volume 16

AUGUST, 1930

No. 8



In This Issue

The Royal School of Mines of Spain

**Some Overlooked Items of
Coal Mining Management and Accounting**

Scope of Mechanical Loading in Metal Mines

**Direct and Indirect Cost Savings
With Mechanized Mining**

Coal Mine Stoppings—Cost and Upkeep

**Preventing Accidents from Falls
of Roof or Coal**

Mine Fire Prevention and Fighting

Legislative Review

Contributors

*Edmundo Roca, Charles H. Plate, Lucien Eaton, Oscar A. Glaeser,
G. B. Southward, Leslie Voltz, N. L. Muir.*

PREVENTION OF ACCIDENTS

. . . has saved this
Coal-Mining Corporation
nearly \$2,000,000 . . .
in 27 years

A WELL known bituminous coal mining corporation has carried its own liability insurance for 27 years. During all of this period the average yearly saving—compared with the lowest premium rates offered by reliable insurance companies—has been more than \$69,000.00.

It need hardly be said that this company has always been an outstanding exponent of "Safety First" mining methods; and it affords us great pleasure also to be able to say that they have always been large users of Ensign-Bickford Safety Fuse.

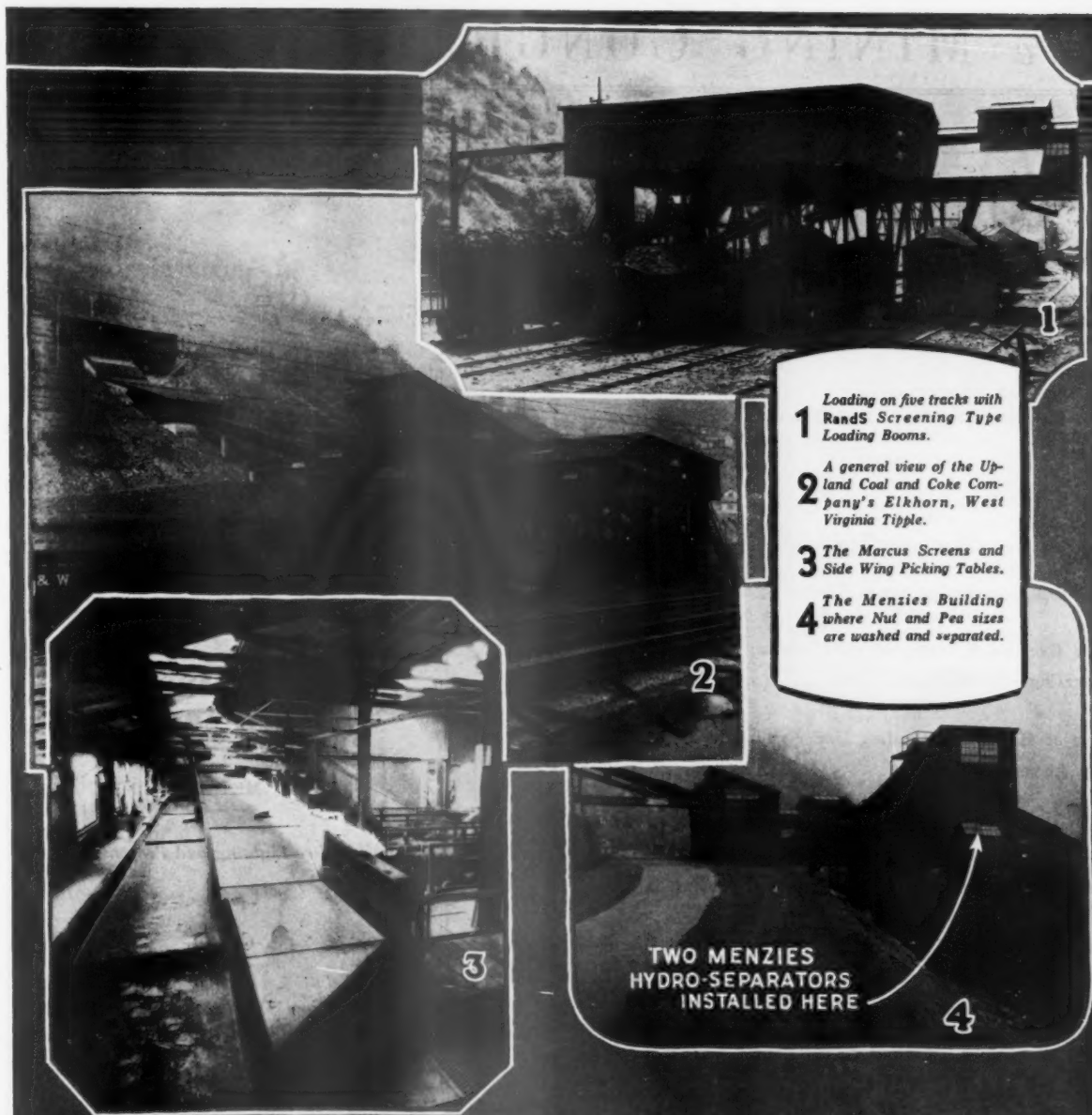
Unfailing insistence upon proper methods in the handling and use of both explosives and fuse has made accidents from this source very rare throughout their entire property; and in one of their largest mines there has been none whatever since 1920.

Such an achievement indicates beyond question the inherent safety of modern explosives and modern fuse; and furnishes additional incentive for unrelenting vigilance in the battle against ignorance or carelessness in their use.

THE ENSIGN-BICKFORD CO.
SIMSBURY CONNECTICUT



Do Not "Short Fuse"
--Fuse should be cut long enough for the end to extend well out of the mouth of the bore hole when the primer cartridge is in place. All holes should be well tamped.



1 Loading on five tracks with RandS Screening Type Loading Booms.

2 A general view of the Upland Coal and Coke Company's Elkhorn, West Virginia Tipple.

3 The Marcus Screens and Side Wing Picking Tables.

4 The Menzies Building where Nut and Pea sizes are washed and separated.

TWO MENZIES
HYDRO-SEPARATORS
INSTALLED HERE

Completely RandS!

THE cleaning and preparing plant illustrated here — the Upland Coal and Coke Company's Elkhorn, West Virginia Tipple — is completely RandS. Designed and built by Roberts and Schaefer in 1926, it has been kept constantly modernized by the simple addition of newer RandS Equipments as the demands of market conditions warranted.

The latest refinements in this plant were the addition of two Menzies Hydro-Separators for washing and separating 100 tons hourly of Nut and Pea Coals.

This plant of 2,000 tons daily capacity prepares Lump, Egg, Nut, Pea, Slack and Picked Run of Mine, using the following RandS Equipments: A Marcus Retarding Conveyor from shaft house to cleaning plant; Marcus Screens and Side Wing Picking Tables; Arms Horizontal Vibrating Screens; Menzies Hydro-Separators; RandS Screening Type Loading Booms and Bradford Breaker.

Mechanical simplicity and high efficiency are fully developed in this plant, a typical condition of plants that are completely RandS.

ROBERTS AND SCHAEFER CO.

ENGINEERS and CONTRACTORS

PITTSBURGH, PA., 418 OLIVER BLDG. WRIGLEY BUILDING, CHICAGO HUNTINGTON, W. VIRGINIA, 514 NINTH AVE.



The MINING CONGRESS JOURNAL

VOLUME 16

AUGUST, 1930

No. 8

Contents

EDITORIALS

Representative Government.....	631	Government by Commission.....	633
Rational Conservation.....	631	Senator Reed Smoot of Utah.....	633
Western Division Convention.....	632	Keeping Step with Efficiency.....	634
Fire Fighting and Fire Prevention.....	632	Are Wage Cuts the Solution?.....	634
Fact Finding and Commissions.....	633	Export Machinery Trade.....	634



FEATURE ARTICLES

The Royal School of Mines of Spain—By Edmundo Roca.....	635
Some Overlooked Items of Coal Mining Management and Accounting—By Charles H. Plate.....	638
Scope of Mechanical Loading Underground in Metal Mines— By Lucien Eaton.....	640
Legislative Review	643
Mine Fire Prevention and Fighting—By Oscar A. Glaeser.....	649
Direct and Indirect Cost Savings with Mechanized Mining— By G. B. Southward.....	654
Coal Mine Stoppings—Cost and Upkeep—By Leslie Voltzs.....	656
Preventing Accidents from Falls of Roof or Coal— By N. L. Muir.....	658

DEPARTMENTS

LEGISLATIVE REVIEW	643
PRACTICAL OPERATING MEN'S DEPARTMENT, METAL	649
REPORTS ON THE MECHANIZATION SURVEY	654
PRACTICAL OPERATING MEN'S DEPARTMENT, COAL	656
NEWS OF THE MINING FIELD.....	660
WITH THE MANUFACTURERS.....	666

Practical Operating Men's Department

METAL

Mine Fire Fighting and Prevention

COAL

*Coal Mine Stoppings
Preventing Accidents from Falls
of Roof and Coal*

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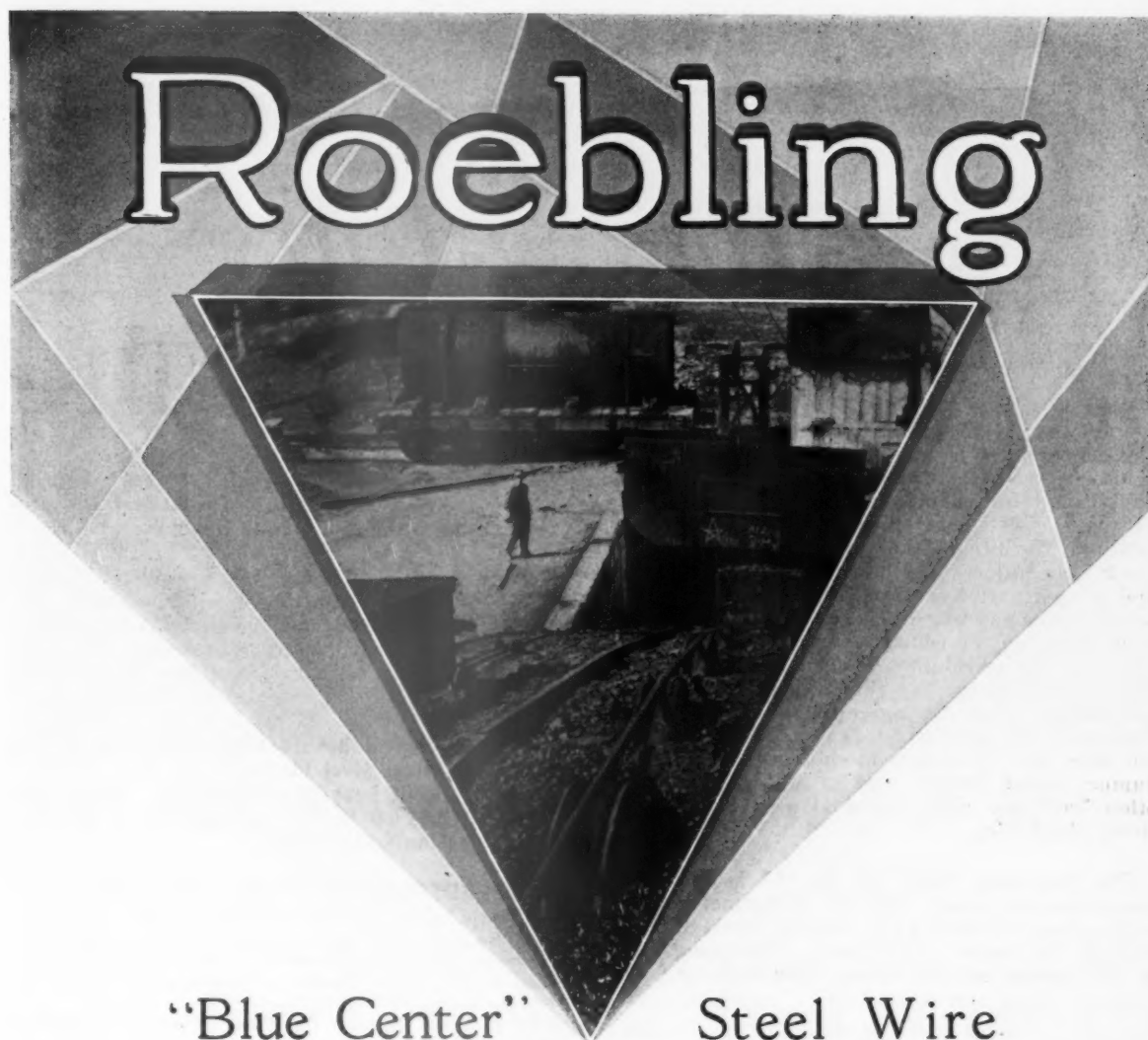
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"Blue Center" Steel Wire Rope

Efficient Service is Economical Service

This is particularly true of wire rope. Frequent replacements are both annoying and expensive. To reduce replacements and increase your efficiency install Roebling "Blue Center" Steel Wire Rope.

It is a superior product worthy of your consideration and is used wherever equipment is purchased on the basis of lowest ultimate cost over a long period of years. Constructed to withstand the heavy strains, abrasion and sudden pulls encountered in mining, it is the choice of discriminating buyers because of its dependability and long life in service.

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XUM



A New *Heavy-Duty* Steel Tie

THE Keystone Steel Tie No. 17 is a new heavy-duty metal tie for use by mines that maintain their own standard gage track system. Used to reinforce wood-tie track, Keystone Steel Ties, substituted for every third or fourth wood tie, carry the full strain of the rail fastenings, add years to the life of the wood ties and hold the track true to gage and in alignment. On curves and steep grades Keystone Steel Ties may be used as stiffeners and to replace gage rods. They prevent spreading or rolling over of the rails, thus reducing the possibility of derailment. This tie has a much longer life than wood ties and considerably reduces tie renewals. Keystone Steel Ties do not become spike-killed or cracked and will not burn out. Use them in sidings, yards, cinder dumps, round houses, and at water tanks and other locations where wood ties have comparatively short life.

The Keystone Steel Tie No. 17 is made of copper-bearing steel. The tie is channel-shaped, with a deep, depressed rib running longitudinally through the center and a heavy reinforcing bulb at the bottom of the sides. The ends are de-

pressed and flared in the shape of a "whale-tail," giving the tie a firm grip on the ballast and preventing lateral motion of the track.

The rolled steel tie-plates are electric spot-welded to the tie, resulting in solid one-piece construction, and reinforcing the tie where reinforcement is most needed, beneath the rails. This construction eliminates rivets and provides greater strength.

The new Keystone Steel Tie No. 17 is similar to the Keystone Steel Tie No. 9, for main-haulage ways, but is of heavier construction. There is a complete line of Bethlehem steel ties; one for every location in the mine.

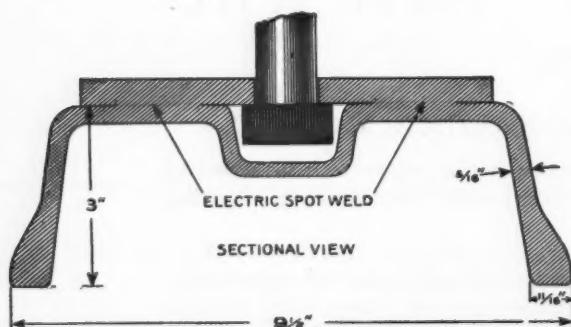
BETHLEHEM STEEL COMPANY

General Offices: Bethlehem, Pa.

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Cleveland, Detroit, Cincinnati, Chicago, St. Louis.

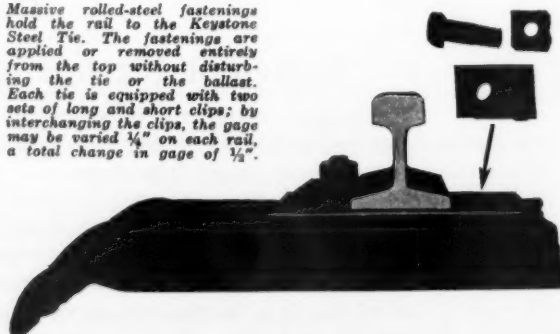
Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu.

Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City.



Each of the heavy rolled-steel tie plates is electric spot welded to the tie, reinforcing it beneath the rails.

Massive rolled-steel fastenings hold the rail to the Keystone Steel Tie. The fastenings are applied or removed entirely from the top without disturbing the tie or the ballast. Each tie is equipped with two sets of long and short clips; by interchanging the clips, the gage may be varied $\frac{1}{4}$ " on each rail, a total change in gage of $\frac{1}{2}$ ".



BETHLEHEM

Keystone Steel Tie No. 17



Bill and Skinny See a Soft Job Ahead

BILL: Well, here she is, Skinny, the new loading machine. Look her over and say what you think of her. Do you think we ought to quit the cutting game and run this 44-C for a while?

SKINNY: Sure! That baby sure loads a lot o' coal. I seen that big Greek, Papapatootapolous run her last night, an' they cleaned out that room in a hurry.

BILL: Yes sir, they got that machine figgered out about right.

SKINNY: How does they do it, any way, jist take a piece o' paper an' a lead pencil, an' make up somethin' like this?

BILL: Oh, they has engineers what knows their loading machines.

SKINNY: I believe that kid o' mine is goin' to be a engineer. The teacher was tryin' to teach the class about fractions, an' she ast them "supposin' there wuz three of youse, an' you had five potatoes; how would you divide them equally between the gang, so that each one would have the same amount?" No one could answer it except my kid.

BILL: What did he say?

SKINNY: He said mash 'em.

A copy of Folder No. 503-B which describes the Jeffrey 44-C Loader is ready for you. Send for it now.

The Jeffrey Manufacturing Company

958-99 North Fourth St., Columbus, Ohio

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JEFFREY COAL MINE EQUIPMENT

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KEEPING DOLLARS FROM WAITING ON DIMES



O-B Trolley Wheels

No intelligent effort is spared to make O-B Wheels the best. The right mixture of metal, the proper pouring temperature, and perfect machining are what make O-B Wheels so good. Page 515, O-B Catalog No. 20 gives ordering information.

Locomotives! *Do You Kill Them?*

YOU can't afford trouble with trolley wheels any more than with locomotives. If a trolley wheel "cuts up" and "kills" your locomotive—it's like a "dollar waiting on a dime." Your driver isn't the only one to suffer. The miners at the face are waiting for empties. The mine manager and others responsible for continuous low-cost production will tear their hair as well.

Wheels cost so little to buy, yet cost so much when they fail, that the best wheels are the cheapest in the long run. Put O-B Wheels on the job. They are different. They ask no favor—just an opportunity to keep your "dollars from waiting on dimes."

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co. Limited
Niagara Falls, Canada
1827M

Ohio Brass Co.

NEW YORK PITTSBURGH PHILADELPHIA BOSTON

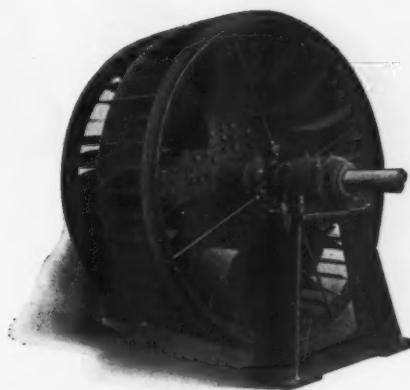
CHICAGO CLEVELAND ST. LOUIS ATLANTA DALLAS LOS ANGELES SAN FRANCISCO SEATTLE

PORCELAIN
INSULATORS
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CAR EQUIPMENT
MINING
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Step Down Power Costs



with Jeffrey Stepped Multi-Bladed Mine Fans



JEFFREY Stepped Multi-Bladed Mine Fans are amply built to handle large volumes of air *at low velocity* resulting in a direct saving of 10 to 30% in power bills.

Mine tests show 80% mechanical efficiency where exact readings are taken on sectionalized air ways and anemometers calibrated by U. S. Bureau of Standards.

The blades are arc welded to center disc—the strongest and most rigid construction possible; no rivets to become loose; wheels can not become unbalanced, and they can be run at high speeds without vibration.

The fan castings are built in four types, blowing, exhausting, primarily

blowing reversible, and primarily exhaust reversible. Fans are furnished with steel casings extending down to the floor line, saving time and expense for installation.

In addition to the fan casings, complete steel side drifts and connections to the mine with or without explosion doors can be furnished when desired.

Jeffrey Stepped Multi-Bladed Fans are built with capacities from 5,000 to 800,000 cu. ft. per minute delivered against mine resistances from 1" to 10" water gauge.

Our complete mine fan catalog No. 455-E will be mailed to any one interested in better ventilation for his mine.

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JEFFREY COAL MINE EQUIPMENT

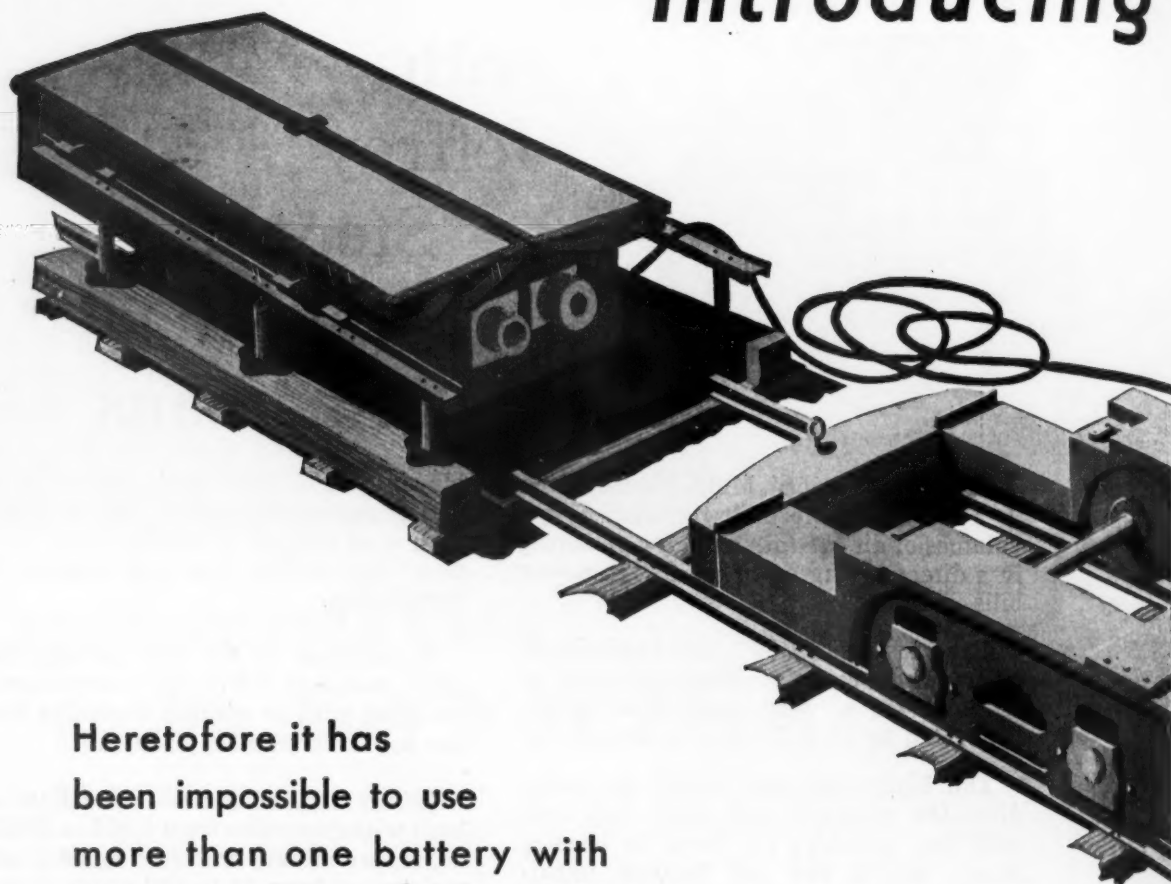
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MANCHA

Introducing



Heretofore it has been impossible to use more than one battery with low type locomotives, compelling the thin seam operator to use a chassis for each battery . . . With the new Telescopic Mancha Electric Mule the exhausted battery can be replaced with a fully recharged one at any time. Send for bulletin that gives complete information.

Patents
Applied For

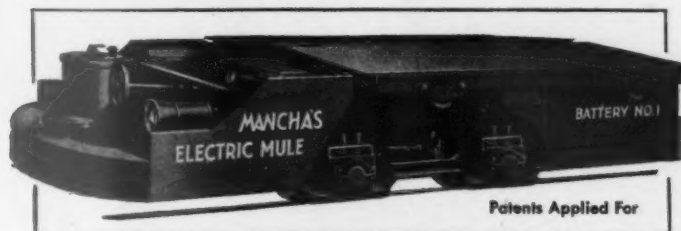
M A N C H A ' S E L

DOES IT!

A TELESCOPIC LOW TYPE LOCOMOTIVE

with Removable Battery and Box

Thin seam coal operators can now have low cost mine haulage. A Mancha Electric Mule of telescopic low type with removable battery and box, combining all the advantages that these Electric Mules are known for, can now be had in open type (will be built in permissible type). This means low cost, safe haulage for thin seam operators. Work the Telescopic Mancha Electric Mule twenty-four hours a day, with a short stop at the end of the shift to drop the battery and pick up a fully recharged one.



Patents Applied For

MANCHA STORAGE BATTERY LOCOMOTIVE COMPANY
1909 South Kingshighway, St. Louis, Mo., U. S. A.

Please send me complete information on
the new Telescopic Mancha Electric Mule

Name

Title Company

Address State

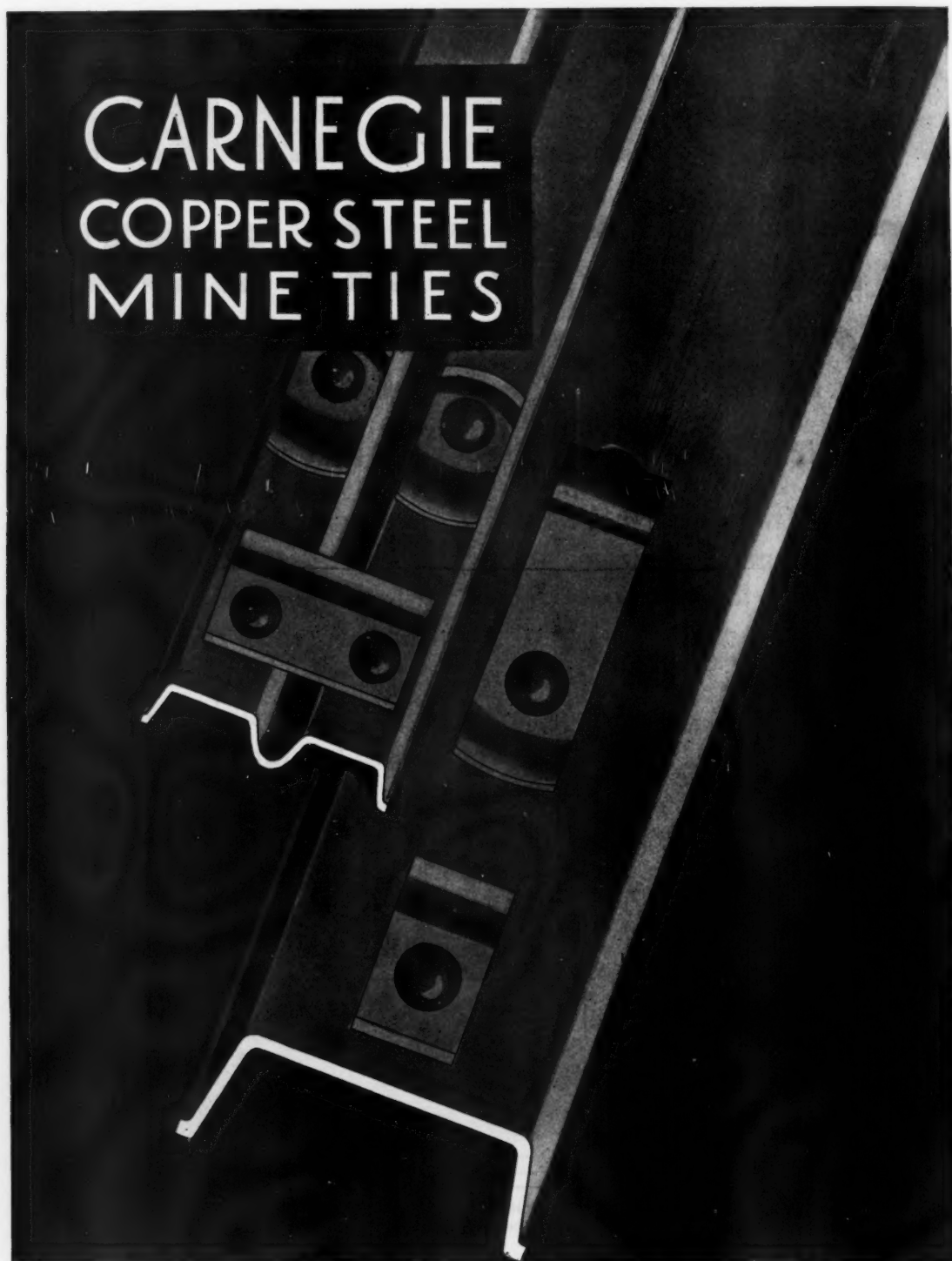
ELECTRIC MULE

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XUM



HERE are the two most popular Carnegie Copper Steel Mine Ties. A light tie for room work. A heavy tie for main haulage ways. Popular because they're easily and quickly laid. Because they're economical. Because they're rust-resisting. But our catalogue tells the whole story. Send for it today. It shows a number of ties,

varying from 2-1/2 to 9 pounds per foot, and from 11/16" to 2-1/4" in height. A variety of clips and fastenings are also available, so that your individual needs may be accurately met.

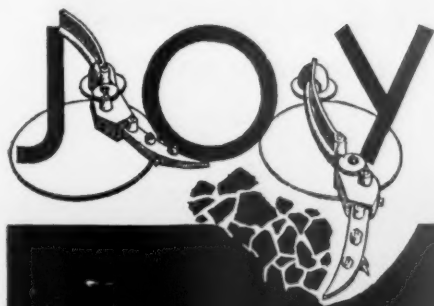
Carnegie Copper Steel Mine Ties will efficiently solve your track problem.

CARNEGIE STEEL COMPANY ❖ PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

EVERY pull of the loading arms, every quick change from place to place, every trouble-free shift worked, every mounting annual tonnage record, increases your realization of the logic of Joy design and construction and helps explain why Joys load the majority of all mechanically loaded coal.

Shown below is the Joy 5-BU type Loader. Guaranteed to load two tons per minute. All operations are controlled by one man. The new 7-BU for low coal will operate in a 48-inch seam. This machine is identical in construction and operation with the 5-BU except for its unique single strand flexible conveyor.



Write for complete data



JOY MANUFACTURING COMPANY
FRANKLIN, PENNSYLVANIA

LOADERS

MINE TIMBER PRESERVATION

When timbering of drifts and other openings must be renewed or the ground caves through failure of decayed timbers, the expense is very great.

Timber decay can be prevented by proper treatment. Much of the delay, annoyance and expense of mine repairs and renewals is thereby eliminated.

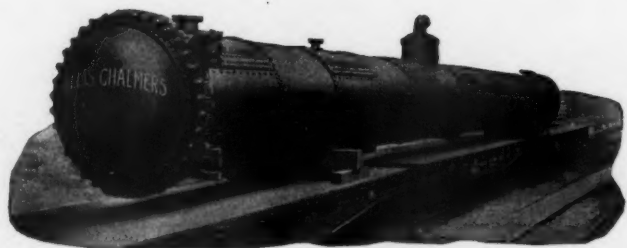


FAILURE FROM DECAY

TREATING
PLANT



Allis-Chalmers designs and builds complete timber preserving plants for treatment of mine timbers. In a modern treating plant the cost of treatment is low and the investment is reasonable, when compared to the saving and the elimination of delays caused by decayed timbers. As builders of both large and small plants Allis-Chalmers engineering experience is at your service. Write for estimate of cost.



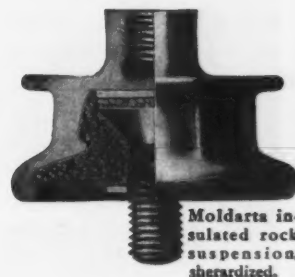
TREATING CYLINDER

ALLIS-CHALMERS

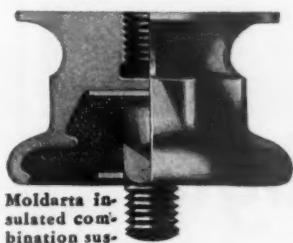
— Allis-Chalmers Manufacturing Company, Milwaukee —

MOLDARTA

*cuts
maintenance
costs*



Moldarta insulated rock suspension, sherardized.

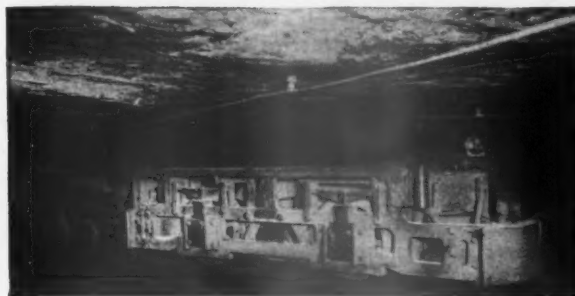


Moldarta insulated combination suspension, sherardized.

BECAUSE of its unusually long service life, Moldarta, a new molded material to protect and strengthen line material, is an aid to operating men faced with keeping production costs within bounds.

Moldarta resists moisture, it will not soften under intense heat, it is very tough and has high dielectric strength.

The use of Moldarta insulated hangers in mines is a guard against unexpected interruptions and an assurance of less frequent shutdowns for replacements. You can standardize on Westinghouse Moldarta insulated mine hangers with confidence.



Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

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Agitate your flotation pulp

with



G-E Centrifugal Compressors

FROM the great mining properties of the Rocky Mountains, from the famous Tri-State lead region, from the fast-developing Tennessee operations, come reports of the remarkable success of G-E centrifugal compressors for the pneumatic agitation of flotation pulp—a success so pronounced that one company has installed 101 G-E blowers for this service.

Here are the advantages reported:

- 1 Saving in power. The G-E blower is a very economical machine to operate because of its high efficiency. In addition, its power consumption varies directly with the volume. Hence, the power drops every time one or more flotation machines are cut off the system.
- 2 Greater reliability and lower maintenance. The G-E machine has only two bearings; it has large clearances between impeller and casing; it is direct-connected to the driver; it is amazingly simple and compact; it is equipped with the famous G-E positive-feed lubrication system.

A most attractive investment for any producer using the flotation process. Ask your nearest G-E office for supplementary information.

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

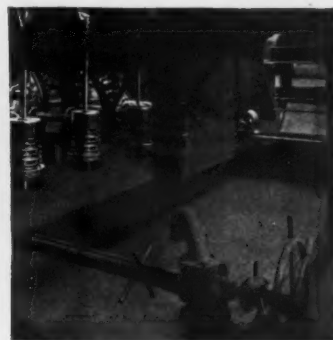
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GENERAL  ELECTRIC
SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES



Complete Link-Belt equipped plant for washing, screening, handling and loading—the United Pocahontas Coal Co., Crumpler, W. Va.

The Link-Belt Simon-Carves, 5-compartment washing unit.



Making "Pocahontas" a still better coal

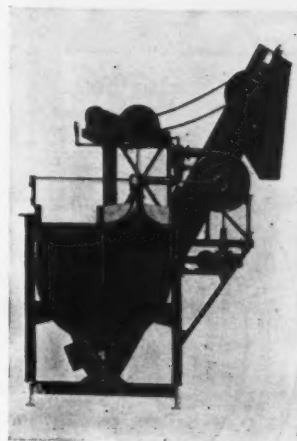
That is being accomplished for the United Pocahontas Coal Company, Crumpler, W. Va., by this combined Link-Belt Simon-Carves Coal Washery, tippie and dry cleaning plant. It is one of the most modern in the southern West Virginia field.

The Link-Belt Simon-Carves Washing Unit prepares all sizes from $\frac{1}{2}$ " to 4", simultaneously, in one box, with an effective reduction in ash content.

Instead of the long period of adjustment usually necessary in starting up some types of washing plants, this unit was taken over by the staff of the United Pocahontas Coal Co. after only 10 hours of instruction and adjustment.

The effectiveness of the Link-Belt Simon-Carves System is due to definitely better principles. These principles assure large capacities per unit, a wide range of sizes that can be cleaned simultaneously, and low cost of installation and operation.

Send for report and literature on the results being obtained from Link-Belt Simon-Carves Washeries now operating in this country. Also send for book No. 555, "Link-Belt Complete Equipment for Handling and Preparing Coal at the Mine."



Section through wash box—the "heart" of the Link-Belt Simon-Carves System. In this system the pulsating medium is compressed air. This eliminates "back suction," that is an inseparable part of the bash jig system because of the use of plungers.

LINK-BELT COMPANY

Complete Equipment for the Handling, Preparation and Washing of Coal

CHICAGO: 300 W. Pershing Road

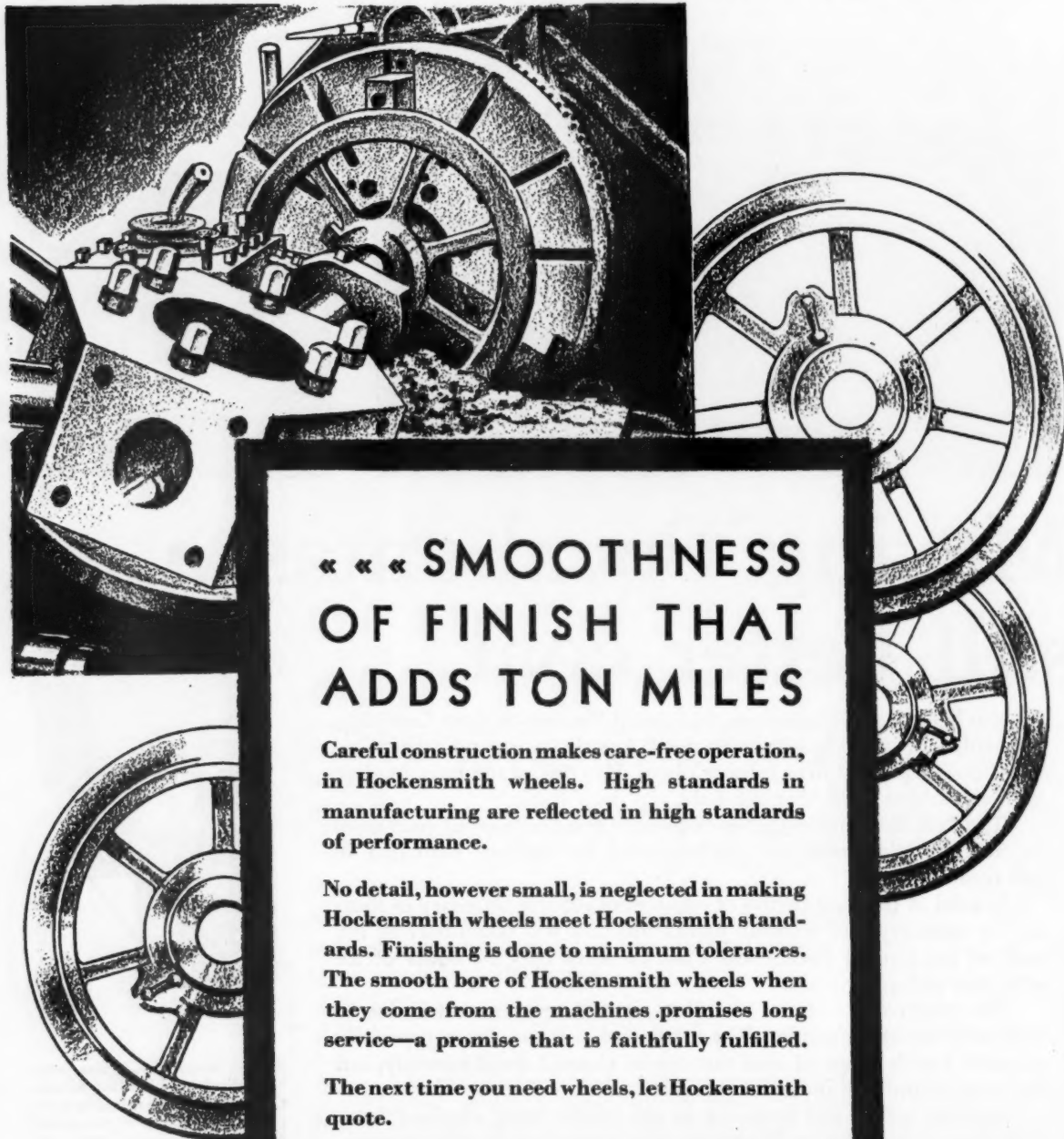
PHILADELPHIA: 2045 W. Hunting Park Ave.

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LINK-BELT

Simon-Carves Coal Washeries

« « « MORE TON MILES AT LESS COST » » »



« « « SMOOTHNESS
OF FINISH THAT
ADDS TON MILES

Careful construction makes care-free operation, in Hockensmith wheels. High standards in manufacturing are reflected in high standards of performance.

No detail, however small, is neglected in making Hockensmith wheels meet Hockensmith standards. Finishing is done to minimum tolerances. The smooth bore of Hockensmith wheels when they come from the machines promises long service—a promise that is faithfully fulfilled.

The next time you need wheels, let Hockensmith quote.

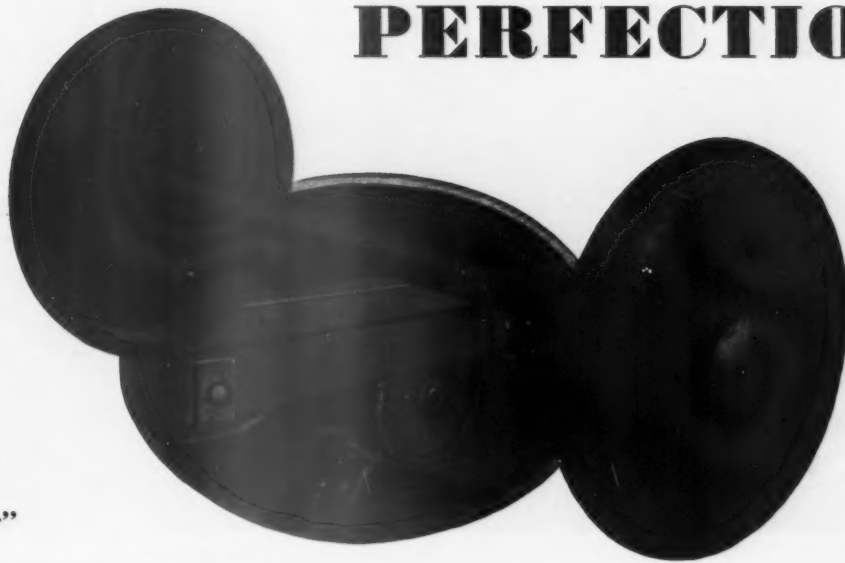
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Penn, Pa. Long Distance Phone, Jeannette 700

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Clarksburg, W. Va.—Mr. Norman Strugnell Chicago, Ill.—W. W. Baker, 140 So. Dearborn St.

Details That Make PERFECTION



"Convey
Your Coal
the
Cosco Way"

MICHAEL ANGELO did not refer to Cosco Shaker Conveyors when he said, "Genius consists in the art of taking infinite pains."

But what he meant fits just as well.

It is the *basic principle* of the Cosco Conveyor System that insured success with more than 400 installations in American mines.

But it was the *perfected details* of construction that kept Cosco on the job day in and day out.

Cosco rollers, for example, are flanged by a patented process from steel plate and fixed to the axles in one operation. Shaped to fit the cradles at the start, there is less wear, smoother action and less consumption of power. And they are infinitely stronger than rollers made from any cast material.

So don't overlook the details when considering conveyor installations in your mines. Perfected details mean longer service, greater satisfaction and surer profits.

CONVEYOR SALES CO., INC.

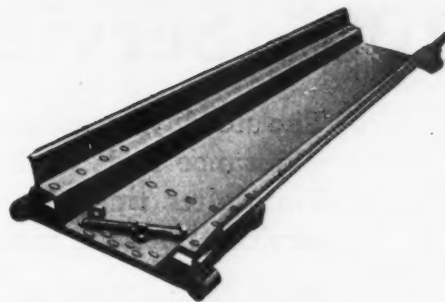
299 Broadway, New York

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Huntington, W. Va., 817 Tenth Avenue.
Knoxville, Tenn., 2725 Magnolia Avenue.
Salt Lake City, Utah, Salt Lake Hardware Co.
Denver, Colo., Stearns Roger Mfg. Co.
Birmingham, Ala., 1802 American Trust Building.
Chicago, Ill., 224 South Michigan Avenue.
Pittsburg, Kansas.

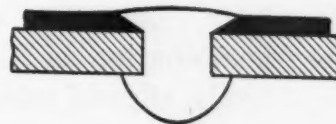


Shaker CONVEYOR



Steel Troughs That Resist Abrasion and Corrosion

Cosco Troughs are made of special analysis open hearth Manganese steel plate to withstand hard usage. Joints are accurately fitted and easily connected. There is great flexibility, with enduring strength throughout.



Reinforced Rivets

The upper illustration shows the usual way of riveting troughs. Note in the lower illustration how Cosco Troughs are riveted. Practically four times as much trough metal is held by the rivet head, making firm unions that will not easily loosen or tear out.



100% Service - With Timkens

The steadily accumulating records of years have made Timken endurance and Timken dependability by-words in industry. Time after time they have been demonstrated by unflinching service under the most trying circumstances.

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Editorials

Representative Government

REPRESENTATIVE government in its more or less perfect state has served this country most admirably. During recent years, for partisan reasons, there has been a growing tendency to misrepresent and vilify those public officials who perform their duties with integrity. The war against representative government has been growing in intensity. Virulent minorities have been able through public clamor and misrepresentation to tarnish the reputation and question the motives of our most conscientious and able representatives. The culmination of this change in policy has been made most effective through that power in the Senate which makes it the judge of the qualifications of its members. In view of the fact that the Constitution outlined what qualifications were required for membership in the Senate, of which qualifications the Senate was made sole judge, it has been assuming that the Senate had power under the guise of the Constitution to withhold or to keep out of the Senate candidates who met all of the constitutional requirements but who for one reason or another did not meet the approval of a cowardly Senate whose position was taken in obedience to the command of a minority of agitators. Thus, states have been deprived of their constitutional right to be represented by men of their own choice and who were fully qualified under the provisions of the Constitution of the United States.

The danger of such a precedent is most startling. Following this example, it is easily possible that the present members of the United States Senate might bar from its deliberations every new member proposed until state after state shall be left without a voice for the protection of their several rights. Under this power the Senate might dictate to a sovereign state who its representative shall be. This is not a likely result but it is a possible result. It would be no greater usurpation of power for the Senate to declare that their elections for a term of years held "until their successors are duly elected and qualified" and only a step farther to complete oligarchy.

Complete representative government can only be preserved where every state and every congressional district shall be permitted to name its own representative without regard to his character, his color, or his previous record in political matters. Many cases have been known where a strong political majority in city councils and in state legislatures have barred from membership without just cause men who were legally elected to speak for constituencies entitled to representation.

The power of the Senate to pass upon the appointments made by the President to important positions—a very proper power in itself—is being exercised in a way

very detrimental to popular government. One of the greatest lawyers and statesmen, a man whose character was above reproach and who was most eminently fitted for a place upon the Supreme Court bench of the United States, Charles Evans Hughes, was bitterly opposed in the United States Senate, upon the ground that at some time in his life he had expressed an opinion which did not meet the approval of a holier-than-thou Senator. More recently still, Judge Parker's nomination to fill a vacancy upon the Supreme Court bench was rejected because a decision which he had rendered did not meet the approval of a few more of these men who again were coerced by agitators from the outside who demanded his rejection because this particular case had not been decided in accordance with their views. Not long ago, one of the very able members of the Interstate Commerce Commission, John J. Esch, was refused re-appointment because he had rendered some decision which did not meet the approval of an outside minority.

We have no brief for these men, nor for the correctness of their decisions, but we insist that the public service is in grave danger when those who aspire are forced to adjust their opinions to the views of radical minorities whose power of coercion is sufficient to command such ill-advised action.

Rational Conservation

A RECENT article by Dr. Geo. Otis Smith, Director, United States Geological Survey, gives a comprehensive and true picture of conservation as an economic issue.

It is very encouraging to note Dr. Smith's view that "Conservation has Arrived" and that "Today it is a policy of Practical Business." Dr. Smith's article recently published in the *United States Daily*, under the title "Prices Lowered by General Use of Conservation," says:

"Conservation has arrived. Twenty-odd years ago the word 'conservation' was the then new name of a program of political reform; today it is the label for a policy of practical business. Both name and idea are accepted by practical men.

"For some years now it has been evident that one trouble with the conservation movement was that at the start there was a common misunderstanding of the idea and the reason for this was that the idea had two aspects. There were then and are now two fairly distinct types of conservation—practical conservation and political conservation. Those who have believed in practical conservation have thought in terms of engineering efficiency, avoidance of waste, and wise use. The advocates of political conservation have thought in terms of social justice, avoidance of monopoly, and future protection of the public interest. The engineer-

ing mind seeks to discover and create wealth; the political mind desires to distribute that wealth.

"Conservation of the practical type concerns itself with ways and means of using most efficiently both capital and labor in the utilization of natural resources. This is purely a problem in engineering, but its successful solution in the United States calls for the assistance of lawmakers and public executives. The end sought has country wide significance, and under our form of Government the people's will must be enlisted in the people's interest. To this extent, conservation has its social and political side, but there is no warrant for making practical conservation in any sense a political or partisan issue. It is rather something to be worked out in practice by business men."

Dr. Smith concluded his article in these words: "There is a real basis for renewed faith in self-control within an industry as an effective factor in the rational regulation of our economic life. Conservation of natural resources is a workable policy."

It is exactly upon this line of thought that the committee created by a resolution of the Thirty-third Annual Convention of the American Mining Congress is working. This committee is made up of presidents of the organizations representing oil, copper, iron, lead, zinc, anthracite coal and bituminous coal. This committee has submitted a recommendation to the directors of the American Mining Congress, to the effect that Congress of the United States should be asked to make more effective the recommendations of the Federal Trade Commission in its sponsorship of fair trade practice agreements entered into by the operators in each of the several industries at their option, but under the direction of the Federal Trade Commission. This committee believes with Dr. Smith, that self-control within an industry as an effective factor in the national regulation of our economic life. It recognizes that over-production leads to waste of mineral resources. It believes that cut-throat competition leads to the gouging of the higher grade ores in order to meet market conditions, and at the same time, so mix low ores with the waste matter as to make their future recovery impossible. It believes that the maintenance of production capacity far in excess of any possible market demand is a waste of energy, and a waste of capital for which there is no recompense. It believes that an agreement between producers of any particular mineral substance to regulate their production to probable market demand so long as that regulation is entirely for the public benefit should not be restricted, and that the Federal Trade Commission might well be given authority to determine that such acts be immune from Federal prosecution until such time as the public's interest is jeopardized, at which time its approval can be withdrawn—in other words, authority is asked for the Federal Trade Commission to permit a proper conservation of mineral resources and to cancel such permits whenever production is so limited as to prevent full and free competition, as a protection to the consumer.

Western Division Convention

WITH the growth of the Trade Association, the question of "Why Conventions" is becoming more and more frequent. Thousands of dollars and much effort are expended each year in developing conventions, in transportation to and from conventions, and in bringing out the best thought as to how to meet the needs of great industries.

Is there any better manner in which results may be accomplished? Probably not. There is a very definite need for a better understanding between industries and

a greater cooperation and sympathy among the various units of an industry.

The western mining industry will meet at El Paso, Tex., during the week of October 13. The parent organization—the Western Division of the American Mining Congress—is preparing a most helpful program. It will have the cooperation of all the great mineral organizations and will present the subject of mining from various angles. The American Mining Congress will discuss the economic problems of the western metal producer—taxation, tariff, the international silver situation. It will also present an interesting array of papers on practical operating problems. The American Institute of Mining and Metallurgical Engineers will present the technical side of the mining of western ores, and the papers arranged for its sessions are of vast importance. The Associated Oil Geologists, the American Association of Engineers, the West Texas Geological Society, and the Centro Nacional de Ingenieros will each present interesting phases of mining.

The result will be the bringing about of a wider and more sympathetic understanding of a great industry; coordination of the problems of all into one central channel; a closer and keener understanding of the individuals who constitute the industry; a better appreciation of the interdependency not only of groups within any one branch of the industry but of the groups themselves with each other.

Collective pulling means hauling the load successfully. And that, and that alone, is the answer to "Why Conventions."

Fire Prevention and Fire Fighting

THE American Mining Congress and the National Fire Protection Association, as joint sponsors, have completed a standardization project known as "Recommended Practice for Fire Fighting Equipment, Preventive Measures, Fire Signals and Fire Fighting Personnel in Metal Mines."

Part I, Fire Fighting Equipment, includes complete recommendations as to water and water supply equipment, fire extinguishers, fire pails and sprinkling systems and oxygen breathing apparatus. *Part II, Fire Preventive Measures*, covers in detail recommendations as to ventilation and ventilation equipment, explosives and electrical equipment. Finally, *Part III, Fire Signals, Fire Fighting Personnel and Miscellaneous Measures*, deals in a comprehensive manner with proper telephone and pull bell wire systems, the introduction of stench fluid into the air lines in case of fire and the flashing of mine electric lights to announce fire.

A discussion of this standard by Oscar A. Glaeser, safety and ventilation engineer, United Verde Copper Company, appears in the Practical Operating Men's Department, Metal, of this issue. Mr. Glaeser states:

"As it stands today, this standard is a compilation of a vast wealth of information, born of experience in the heat of mine fires and brought together from all of the mining sections of the United States."

Mr. Glaeser rightly points out that since there is no law demanding these preventive measures, no underwriters code which requires them and, lastly, no insurance company that will take the risk and assume the financial protection of tremendous underground investments, and that it is up to the mine operator to write his own insurance in terms of a fire code and pay his own annual premiums through the strict observance and conscientious application of this fire fighting standard.

Fact-Finding and Commissions

THERE really is a difference between fact-finding bodies and commissions, even if there is no distinction made between the two in the public mind. It is this lack of discrimination that has caused the widespread criticism of what appears to be the present Administration's trend toward the commission.

This is not a defense of the commission form of government, but it is a defense of the Hoover method of finding out what is needed before action is taken. Mr. Hoover has based his life success upon engineering, which profession calls for facts before action. His method of ascertaining the facts has been by the appointment of a commission, composed of those who, in his judgment, are best equipped to serve, who are voluntary, unpaid workers, and who bring back to the President the information necessary to determine whether there is need for governmental action and what recommendation shall be made should such action promise to serve the public interest.

It has been pointed out that 14 such commissions have been created and that their range of investigation covers law enforcement, prohibition, unemployment, public domain, child health, illiteracy, and others.

It is not the investigative commission that has caused the protest. It is the confusing of this sort of a commission with the more or less permanent commissions which have regulative prerogatives that meet with public disapproval, and of this number Mr. Hoover has appointed none. Nevertheless, he inherited some 50 or more which have gradually been assuming an amazing place in our political life.

We do not object to the Administration's method of gaining information, but we are opposed always to government interference in any field in which private enterprise can properly function, and in those fields where governmental agencies are essential we urge that any action taken should be based upon the complete knowledge of the facts and conditions involved.

Government by Commission

THE perusal of a copy of the official roster of our Government machine leaves a feeling somewhat akin to alarm when the list of commissions is scanned. There are more than fifty of them. David Lawrence, editor of the *United States Daily*, who is giving a series of radio talks on departmental relationship to industry, has considerable of a job even if he confines his discussion to major industries and their commissions. He pointed out in a recent talk that the coal industry has thirteen governmental agencies delving into its affairs, seeking information and what-not.

Judge Ira E. Robinson, chairman of the Federal Radio Commission, in an address before one of the conventions of The American Mining Congress, wherein he discussed the Commission as an adjunct to government and industry, said:

"Commerce and industry are continuously developing new instrumentalities adding to human wealth, comfort and enjoyment. As these new things develop, new problems in legal rights and relationships naturally arise. The law, in attempting solution of these problems, moves ponderously along at some distance behind the progress of science. While this is deplorable, the idea that law follows, does not lead, scientific or material development is sound. It would not be safe to permit the Courts, or to encourage the legislatures, to anticipate problems in human relationships which have not yet arisen.

"In those matters which come under the control of the Federal Government, the tremendous development of the railroads, radio communication, perhaps later, interstate dis-

tribution of power, and similar enterprises, has brought this situation to the fore as a national problem. The impossibility of complete handling of problems by congressional legislation has compelled the creation of commission.

"Such enterprises must submit to governmental regulation in the public interest. The possibility of providing that regulation flexibly, quickly and scientifically through commissions has proved a real gift to governmental science.

"Similarly in the states, the administration of rules for the preservation of health, the development and use of natural resources, the compensation of injured workmen, and the consequent expedition of industrial safety and stability, have all been inevitably tending toward commission administration.

"Commissions are generally composed of a relatively small number of men, responsible only to an appointing power, and acting in a manner whereof judicial review is not generally recognized or convenient. To be of aid to government and industry, these commissions must be so created, manned and conducted that they do not lose sight of the American ideals of due process of law, orderly procedure, and fair play. Commissions more than courts, executives and legislatures, must avoid even the appearance of arbitrary action. Their scientific and industrial background, their contacts with the momentous movement of modern life, will make them a true aid to government and industry only under such concept."

A commission without regulatory power—a fact-finding commission—many times develops into the permanent regulatory body. The present tendency to run government by commission is fraught with danger, and the creation of further such bodies, or the perpetuation of those we have, should receive serious consideration.

Senator Reed Smoot [AN APPRECIATION] of Utah

IN THE Senate of the United States, on June 25, 1930, an event was enacted, apparently colorless but yet making record of a very unusual situation. Senator Reed Smoot announced to the Senate the beginning of a vacation, and for the first time during 28 years of service asked to be paired upon any action which might arise during his absence.

Senator Smoot announced that during this long period he had been absent from the chamber for only nine days. This is but a small part of the story, because the record will show that Senator Smoot has not only been in his seat at some time during each day of these many years but has been there all day and all of the time, and always alert to the interest of his constituents and the public at large.

For many years Senator Smoot has been the floor leader for many of the most important bills before the Senate. His record for hours of actual service upon the floor of the Senate cannot be duplicated by any other three members. Not only has Senator Smoot been always on the job but he has most assiduously studied every subject considered by the Senate during this most eventful period of the history of the United States. His constituents or those who, mindful of his enormous influence, were anxious to present to him their views as affecting legislation under consideration, were always granted a hearing. Appointments have been made late in the evening, after an arduous conflict upon the Senate floor, which kept the Senator from his dinner hour perhaps two hours after others had left their offices. His record for service even has been surpassed by his record for intelligent service; his has been the leadership for a very large amount of that legislation upon which the marvelous growth of the United States has been predicated during this quarter of a century.

Other men have occupied more colorful posts, but no man in the United States has rendered more valuable service to his country during its most eventful period than has Senator Reed Smoot, of Utah.

Keeping In Step With Efficiency

DURING the last decade coal consumers have increased their combustion efficiency to the point where one ton of coal is now doing the work formerly required by several tons. The coal mining industry is now faced with the problem of keeping in step with this increased efficiency on the part of its consumers. It is also faced with the necessity of competing with other fuels, such as oil and gas.

It is only within the last few years that the industry as a whole has become conscious that its methods were out of date and that the organization of the industry was designed to fit in with conditions that no longer exist. Coal was formerly sold on appearance, but today the laboratory analyses determine the buyer's specifications, which no amount of argument or salesmanship can refute. Coal cleaning plants are being installed on a scale and at an expense beyond any belief which existed a few years ago.

The same character of change is taking place in the methods of distribution. Vertical expansion or combinations between the mines and the consumers are taking thousands of tons of coal off the open market. Mergers of operating companies and consolidations of selling companies, together with trade practice agreements in various fields, are steps leading toward the elimination of the cut-throat competition which has brought about so much financial loss to the coal producers. These things are not yet accomplished but are in the process of forming. Underground operations are also undergoing changes. Mechanical loading has now become an established fact, and its success is indicated by a growth of 75 percent during the year 1929. Underground mechanization is now complete, and with the use of machinery for all mining operations we can expect not only a greater efficiency and a lower mining cost but also better working conditions, safer mining, and a higher class of employe underground.

Coal is the basis upon which our civilization rests. In addition to being a source of fuel supply it has, through its by-products, hundreds of other uses, ranging from fertilizers to dyes and perfumes. It is inconceivable that an industry so basic and so essential should not keep pace with progress in other industries, and the fact that it is now awakened to the need for modernizing is a sure indication that its modernization will be effected and that coal mining will again become profitable for its owners and its employes.

It is largely through cooperation and combined effort that this modernization is taking place. There are too many phases of mining in which changes must be made for it to be possible for any one individual company to find all the answers. This spirit of cooperation is evidenced by the willingness of coal mining men to exchange ideas and to break away from the secrecy and the unwillingness to cooperate which was characteristic of the industry a few years ago.

Are Wage Cuts the Solution?

THE Consolidation Coal Company is a major factor in bituminous production. It possesses the capacity to produce some 15,000,000 tons annually. It has been producing coal since 1864. In that period it has shown steady growth and expansion. Therefore, the industry takes cognizance of its policies.

Two years ago, President Anderson of this company announced the decision to permanently close 10 of their less efficient, high cost mines. The company chose this

method, he said, rather than that of cutting wages and shortening working hours.

Recently Mr. Anderson made another announcement. This time it was to the effect that the policy adopted by his company two years ago had not accomplished the desired result and that they were now reducing wages. In doing so, he made it plain that they do not do it willingly; that they feel that such action is but a make-shift, and that nothing can be gained by present business methods in the coal industry. They point out that in taking this action they do not yield the conviction expressed two years ago, and as the company "has twice been the last to follow into this dreary path, so it will cheerfully be among the first to abandon it."

The closing of the inefficient properties did not solve the problem of competition. Will wage cuts do any more? Will the policy of "seeking to solve excess capacity by more and more output, deficient income by less and less revenue; trying to repair damaged profits by larger patches of loss" help the situation?

What will be the result of this decision? Will it force the beginning of the long-needed cooperative effort to establish coal upon the sound economic base it should occupy in our industrial family, or will it presage a bitter competitive battle for markets and an open season for hostilities which will eventually lead to the extermination of one side or the other? Wisdom should dictate a policy that will permit a surcease from the price wars that have been in progress.

Export Machinery Trade

PROBABLY the only reason that the manufacturers of mining machinery have not been greatly impressed by the present almost limitless debate on the reciprocity notion in connection with the tariff bill, is because of their supremacy in their field. Advancement in mining machinery has been marked in this country; nowhere else has there been developed such remarkable machines for the recovery of minerals.

Nineteen twenty-nine was a banner year for these manufacturers in their export market. According to the Industrial Machinery Division of the Department of Commerce, exports of mining machinery exceeded the 1928 figure by more than three and one-half millions of dollars. The value of the total export was \$17,953,877, and this figure is strictly for machinery for the mine. Excavators, power shovels, dredges and air compressors are not included.

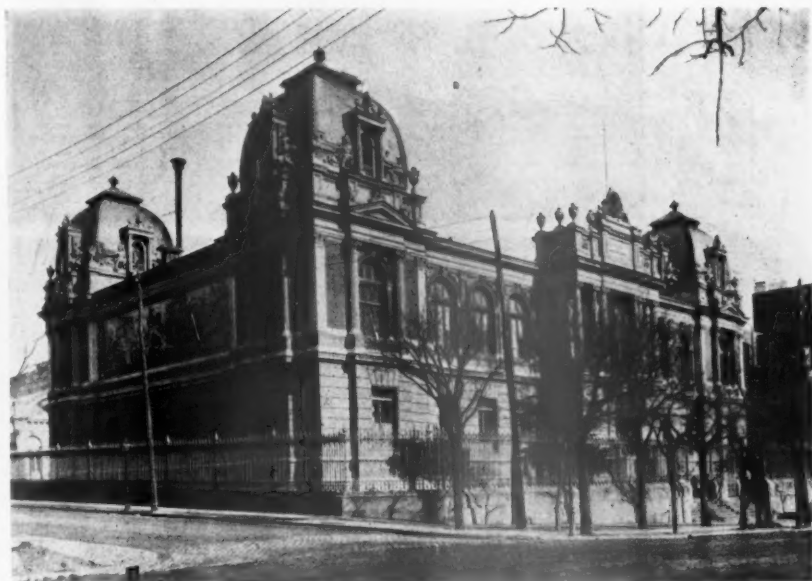
Europe, South America and Canada were our largest customers. Mexico, Newfoundland and Central America also were substantial purchasers. Russia's coal fields, and Rhodesia's copper deposits, which are now in the process of development, offered fertile markets.

This exodus of modern American equipment connotes two things: a recognition of the superiority of our machinery, and the certainty of competition in world markets for the products these machines are helping produce. Canada in 1929 increased her export blister copper two and one-half times, her nickel and its products 40 percent, and her gold 37 percent.

American engineers and American machines are spreading the doctrine of efficiency throughout the world. Tariffs and taxes, mountains and rivers, deserts and depths will not matter. So long as natural resources offer their great reward for individual effort, just so long will capital and modern efficiency follow.

AN OLD MINING COLLEGE

The Royal School of Mines of Spain



By Edmundo Roca *

AS THERE has been lately some discussion in this country concerning the proper methods of preparing men for the mining engineering profession, it may be of interest to make a comparison of the curricula of the mining schools of this country and those of foreign countries, for, as a rule, the curricula of most of the mining schools of Europe are entirely different from those in the United States and, if this fact is clearly understood, there should be a better international understanding along professional lines which, of course, is to be desired.

The Royal School of Mines of Spain has the honor of being the fourth oldest school of

mines in the world, as it was established by Royal Decree of Charles III, issued July 14, 1777, thus being the oldest engineering institution in Spain. It was located first in Almaden and was later transferred to Madrid in the year 1836.

This fact is of itself of little value, in so far as the training of engineers is concerned, but when coupled with the fact that the school has from its beginning maintained an excellent teaching staff and has been supplied with the most up-to-date equipment, it is not difficult to understand why the school has such a well-established reputation.

Among the alumni of this school are many who are distinguished both at home and abroad, as for ex-

ample Casiano de Prado, a geologist whose reputation has been duly acknowledged in foreign countries; likewise Larranaga, Mallada and many others whose names are well known. Mention should also be made of Barcena and Hereza Ortuno, both internationally known in the present-day mining industry.

Spain, as it is known, is a country of very old mining and metallurgical traditions. The mines there have been worked since the most remote historical times. During the middle ages they belonged to the Crown Patrimony and the income from them covered the expenses occasioned by the wars with the Arabs. It was Bartolome de Medina who, in 1557, discovered the amalgamation process for silver; the work of Alonso Barba is so well known that no comment is necessary; and who has not heard of the Catalan forge? In a line more related to chemistry it will be well to remember that it was Don Fausto de Elhuyar who first obtained metallic tungsten; and Don Antonio Ulloa who discovered platinum.

Spain's present importance as a mining country is due not only to the mines of Almaden and Rio-Tinto, which are well known all over the world as deposits of extraordinary size, but likewise the fact that the common metals can be found in Spain in sizeable quantities and the annual value of all minerals produced, quarries excepted, is about five hundred million pesetas. In this connection it is to be remembered that Spain exports not only iron pyrite and quick-silver, but likewise copper, zinc, lead and silver in large quantities, and the reserves of potassic salts are of no little importance; an American mining engineer who lately returned from Spain expressed surprise at the many opportunities in Spain for the development of additional mining enterprises.

In the early days of the Royal School of Mines the students had a military status, being considered as commissioned officers in the regiment of the Crown of New Spain and were called cadets. In 1833 a corps of mining engineers was created by the government and to the school of mines was assigned the duty of filling its ranks, at the same time that it prepared experts for private enterprises. This duality of functions brought about the division of the students into two classes, one of which might later enter the government service while the other was denied this privilege. One peculiar existing regulation is that in the calculation of service for old-age pensions, those entering the civil service are credited with eight additional years of service, the time they have spent studying their specialty being considered as work done for the government.

Many of the eighteen professors and five associate professors on the faculty



Central "Patio" of the School

* Traveling Fellow from School of Mines of Spain.

of the Royal School of Mines are widely known. For example, Sr. Fabrega has received the honorary degree of Doctor from the University of Breslau. The student assistant, found in many American schools, often as young and hardly more competent than the students taking the course, is unknown in the Spanish system of education.

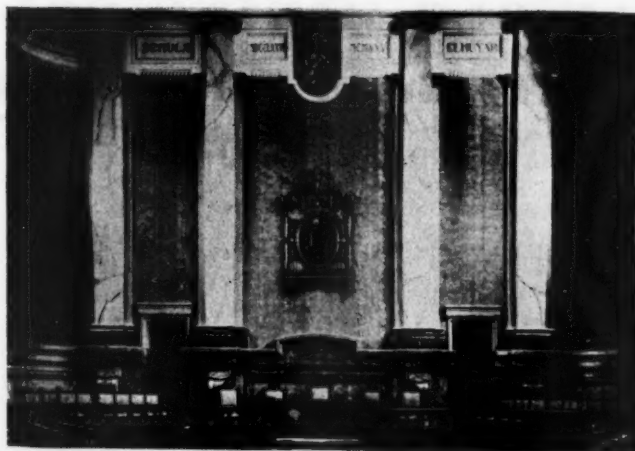
The Royal School of Mines of Spain differs from the majority of mining schools in the United States in that it has no connection whatever with the university or with other branches of engineering studies; in fact, every engineering college is a unit by itself and all are housed apart at some distance from each other. As a consequence some of the fundamental courses have to be duplicated, but this has its advantages due to the fact that every class is small and hence each student receives more personal attention than is paid to the student where the classes are large. Furthermore, there is not the lack of coordination that may take place between the different departments in a big university.

More differences can be found if education as a whole is compared in both countries. The degree of high school graduate in the United States is not equivalent to the degree of "bachiller" in Spain; the possession of the latter, in old times, was the only means by which one might hold the much-coveted title of "Don" and is now a requirement for entrance to the engineering schools.

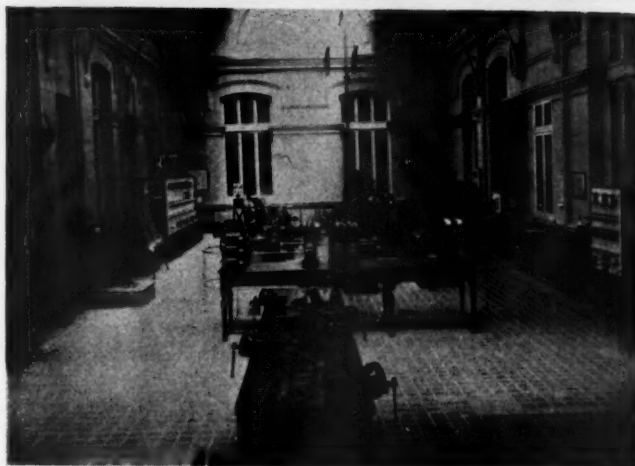
In Spain there are schools which, so far as I am aware, have no parallel in this country, namely, schools for the training of foremen, which are comparable in importance to those for the training of engineers. In Spain, the director of the school of mines is at the same time the head of the seven foremen schools located at Almaden, Bilbao, Asturias, Almeria, Cartagena, Huelva and Linares. In this way a clean-cut distinction is made between the trade schools for the training of foremen and the courses of study pursued at the Royal School of Mines, having for their object the providing of future executives and administrators.

It may be against the democratic idea to try to develop quality at the expense of quantity, but one of the leading educators of this country expressed to me the need of mining engineers with a greater cultural background and those who are familiar with the situation in Spain are aware that the prestige that surrounds the engineering profession is due largely to the engineer having received more thorough education than those trained at the university. In order to select only the best men, the School of Mines of Spain requires all candidates to be between 16 and 22 years of age

School
Auditorium



Electro-
technical
Laboratory



A corner of
the school
museum



and to take entrance examinations chiefly on mathematics which include advanced calculus and differential equations. At least two or three years of study are necessary for the successful fulfillment of these requirements. This provision has heightened the prestige of the Royal School of Mines as they have strictly adhered to their standards.

These abstract studies develop in the minds of the students the method of at-

tack and analysis. The strictness in eliminating prospective students with these examinations meets with general approval, even by the students themselves, because it is found to be a good method of avoiding an oversupply of graduates. The number of students in each class is thus limited to some 15 or 20.

An average of three years are spent in a preparatory academy, prior to tak-

ing up the course at the school of mines. Here the schedules are so heavy that part-time work is almost impossible. From this heavy program there is no alternative for there is no other school of mines in the country and the engineering courses offered at other schools take a similar amount of time. It has been recognized that such thorough training can not be given during a smaller period of time as the acknowledged purpose is to develop thinkers.

As the peculiarities of the profession require that the mining engineer should have the broadest knowledge possible, the fixed schedule established, with no electives, requires the students to take about the total number of courses which are usually split into mining, metallurgical or geological options in the United States. This can be done because the School of Mines of Spain offers no courses in mathematics; these are supposed to have been mastered by the student in his preparatory work, together with two languages. A real knowledge of French is stressed. There are also some other comprehensive courses in economics, law, two years of electro-technics and a one-year course in geodetics in addition to the topography previously taught. Overspecialization is avoided in this way.

Contrary to the prevailing customs in this country, no written examinations are given to the students, but, in addition to the final oral examinations of one hour and even one hour and a half duration, daily oral quizzes are held for the purpose of training a student to think quickly, which, of course, is very necessary.

Another feature of the Royal School of Mines is to require of its students some practical experience in an industry during the last two years. This work is divided into two periods, the second of which is of not less than six months in duration, and the degree of engineer of mines is not conferred by the school unless the report on the practical work is approved by the faculty. During the stays at the places chosen by the student, with the approval of the school, the cooperation of the officials permits the prospective engineer to learn about the operations from a managerial point of view.

The idea existing in the School of Mines of Spain is not to tire the students by keeping them occupied an excessive amount of time; the aim is rather to equip them with a sound background of fundamentals. This purpose is undeniably achieved.

As a complement of the courses taught in the school, four inspection trips, of two or three weeks' duration each, are required of the students; the last one usually through a foreign country in

order to compare outside practices with those at home. These trips do not include the many visits and short trips made to nearby power plants, electric stations, dams and so forth. All this gives to the student a really broad outlook on industry. The total expenses of the four inspection trips are borne by the government and not by the student; in the same way tuition fees are practically negligible. Both of these facts are evidence of generous aid to the student by the government. Foreign visitors have commented upon the large amount that is invested by the government per student. The school is now housed in magnificent new buildings, a rare thing in Europe, and its equipment is up to date and extensive, as will be noted from the accompanying illustrations and which fact can be appreciated only by a visit to the school and by inspecting its laboratories and its large collections of minerals and fossils. Also noteworthy is the quantity of surveying apparatus, including the latest and most accurate types, which are rarely found in other places. The apparatus is not kept in showcases but is used in practical work by the students.

The library contains about 200,000 volumes on mining and subjects related to it. Other types of works are excluded because they can be found in the many excellent libraries existing in the city of Madrid.

The location of the Royal School of Mines is another important feature. Situated in Madrid, it possesses a unique cultural and social atmosphere. At the same time it is in close proximity to mines of many types due to the fact that Spain is comparatively small in area, but rich in mineral deposits.

Under the direction of the school exists the laboratory for metallographic research. Among other duties of this laboratory is the extensive testing of material brought from metallurgical plants which have failed to function; an endeavor is made to determine the cause of these failures. Also under the direction of the school is the foundation Gomez-Pardo, where the Commission of the Damp has its headquarters; there analyses of ores are made, together with extensive testing of the same. This foundation was established by a legacy to the school of mines and has done important work in the way of publishing original technical papers, etc.

The Geological and Mining Institute of Spain is now occupying a new building adjacent to those of the school, and in this way permits a free interchange of ideas among the engineers working in the institute and those teaching at the school of mines.

All in all, I believe that a student in Spain is of quite a different type from

the student in the United States; that he is, on the whole, more serious in the pursuit of his studies as there are no extra-curricular activities to which he must give his time. In accordance with precedent, he has a markedly respectful attitude toward his professors, who are never treated as colleagues but as superiors in learning and experience.

Similar in standing to the Royal School of Mines are the other engineering institutions of Spain. They have produced and are producing outstanding men in the engineering world. As the Spaniards are, as a rule, not given to advertising propaganda concerning their country, it is not generally known that the genius of Torres Quevedo created the aerial tramway over Niagara Falls as well as a calculating machine that extracts any kind of real or imaginary root. The autogyro of La Cierva has received a little more publicity; it is constructed in the United States in accordance with the Spanish plans.

The above are some of the engineering achievements of modern Spain, which is no longer a country living on past traditions, such as fiction chooses to depict.

IDENTIFICATION OF BERYLLIUM MINERAL

The recent research on beryllium alloys with the thought of its use in airplane construction has received such publicity that there has been a widespread search for beryllium minerals, the United States Bureau of Mines observes. While the present consumption scarcely warrants the popular enthusiasm, a good deposit would be distinctly valuable. The only common beryllium mineral is beryl. It is widely distributed but even the pure mineral rarely contains more than 5 percent beryllium.

Recently the Rare and Precious Metals Experiment Station of the United States Bureau of Mines, in cooperation with the University of Nevada, Reno, Nev., has received numerous samples from many states, and from Alaska, submitted for identification of beryl. Of all these samples, only two were beryl, the others were the rose, citrine, milky and chrysoprase varieties of quartz that were mistaken for it.

Both quartz and beryl have somewhat similar physical properties, such as hardness, specific gravity, lustre, color, and insolubility in acids. They differ in the index of refraction and this is a quick test to determine between them. The following method is used: A fragment of the mineral is crushed to a fineness about -100 mesh and +120 mesh. A liquid is chosen with an index midway between quartz and beryl, say, about 1.60. A few of the crushed particles are mounted on a microscope slide in a drop or two of the liquid and covered with a cover glass.

Some overlooked items of COAL MINING MANAGEMENT and ACCOUNTING



By Charles H. Plate*

CONTRARY to a general impression, the business of mining and selling of coal is more than a simple process of throwing so many shovels of black rocks on a car and having the railroad haul to destination. This impression is quite general with the domestic coal consumer, and it is rather unfortunate that some mine operating organizations, to a certain degree, still retain this erroneous idea, particularly with respect to their accounting departments.

Whether the fault lies with the accounting personnel, or whether the management is not sufficiently concerned or refuses to employ sufficient and capable help, is not the purpose of this discussion.

The real purpose is to show the interlocking interest between management and accounting and the necessity for close cooperation between these departments.

STATEMENTS

In the beginning all coal-mining operations were, of necessity, small, with little need for management or the recording of costs. As time went on and the demand for coal increased, some of these operations grew to considerable proportions and with them the need of some method for recording costs. These were the days of so-called hand loading, and the then up-to-date bookkeeper set up the following major cost ledger accounts:

Mining, ventilation, drainage, haulage, tippie operation, preparation, power, mine overhead, fixed charges.

Each of the above major divisions was further subdivided into as many detail accounts as ability, time and help permitted.

Thus under "mining" were recorded all charges relating to the mining of coal, such as diggers in entries, track laying, timbering, etc., and to "haulage" all charges relating to entry costs necessary to haul from face to bottom. In the strictest sense many of these charges were incorrect, due either to carelessness or ignorance on the part of the accounting department. Expenditures had to be charged somewhere, and the book-

keeper, not being an experienced operating man, did his best under the circumstances.

These figures were periodically reduced to a per ton basis and handed to the management. The management cast one glance at the last per ton cost figure and filed the document away with a "water over the dam" attitude. Whether they were satisfied with the year's or month's results, we do not presume to say.

As the years passed, so did conditions change and become more acute. Competition became keener and costs kept steadily mounting, so in a mad scramble to find the proverbial pot of gold at the rainbow's end the management began to cast about for ways to reduce operating costs.

Thus we come to the advent of the present-day mechanical loaders, conveyors, track undercutters, etc. Much money was spent for high-priced equipment, the thought back of it all being greater production within a given time. The additional coal produced added to the existing overproduction, glutted the market to an even greater extent, and many a management, too late, discovered that their treasury had been depleted and decreased running time had shot the cost per ton per year to even higher figures than before.

At about this time demands were made upon the already overworked and undermanned accounting departments for more accurate statements and at more frequent intervals.

And once the management gets the statement fever nothing can stop it; it has no limits. This is brought about by two reasons—one, the management does not know just what they want or how they want it, and, on the other hand, the accounting department, either through its own inability or by reason that the system for gathering this valuable information had not been properly designed, is unable to prepare the requested statements. The result is a mass of unrelated statements, each of some value for certain purposes but none com-

plete in itself, and, as statements are dull and uninteresting, we soon find ourselves exactly at the point from which we started, the whole lot discarded, and an attempt made at a fresh start.

Comparatively few coal-mining companies were blessed with sufficient cash reserves or their plants designed to go to 100 percent mechanization overnight. This had to be a gradual process, and immediately the management began to ask themselves and the accounting department: Does this new machine or device offer economies in operations sufficiently large to justify further expansion?

The old system of a few major cost accounts suddenly found itself obsolete and worse than useless. New methods had to be devised, time studies were made, and gradually out of the mess the accounting departments began to accumulate some of the mysteries of operation and adopt and install permanent cost records to conform.

In the mine where both hand and mechanical mining are employed quite a problem arises to determine just what distribution should be made of certain items on which previously there had been no question.

Take the case of the mechanical loaders: It is now necessary to have an attendant gathering motor, a motorman, a triprider, an additional tracklayer, the cost of which had previously been classed as haulage, but which is now a true mining or loading cost. The mechanical loader alone is not a complete mining unit, and it too frequently happens that the management is deluded into thinking it has acquired a wonderful cost-saving device, and, on the strength of these erroneous costs so ascertained, will purchase additional equipment of a similar nature. This process goes on and on, and then the discovery is made that too many motors have been withdrawn from haulage service to serve the loaders, and it becomes necessary to purchase additional locomotives. The loader does not load the pit cars to capacity as in hand loading, so to get the normal tonnage to

* Comptroller, Franklin County Coal Company.

the bottom more cars are required, which, in turn, again means additional cash outlay for more locomotives and operating costs for motormen and trip-riders. Maintenance and repairs to tracks, hoist and power plant will begin to mount by reason of more frequent and increased travel, haul, and load. Coal loaded by conveyors can not, and does not, come out as clean as hand-loaded coal, so changes and additions to the preparation plant are next in order, together with additional pickers. The vicious circle begins to grow and, unless the accounting department familiarizes itself with these changed conditions and prepares new, better and more frequent statements giving accurate information, the management will soon decide to get one that does.

BUDGET CONTROL VS. DAILY CONTROL

Much has been said for and against the budget system. It has been our observation that the various departments will frequently use their entire allotment, wisely or unwisely, and this is not conducive to the savings now so necessary in the mining industry. In order to at all times have complete control and supervision over costs and expenditures a series of daily statements has been instituted. These statements show the activities of the day and to date are delivered to the interested parties before noon of the day following, and include the realization statement in amounts and per ton, cost statement in amounts and per ton, daily balance sheet showing current items only.

The realization statement is prepared from the manifest sheets and includes for each mine the following information: Percent of sizes sold today, tonnage sold today, amount of sales today, realization per ton today.

To this is added the retail and boiler sales and the whole added to that previously reported. A daily inventory of no-bills and storage coal is also taken, and the completed statement is an accurate result of production sales revenue on any given date.

The daily cost statement is equally as comprehensive, and in its present condensed form covers but one small sheet which includes all mines.

The production costs include labor and supplies including mine overhead, all shown separately. Royalty, compensation, insurance and taxes are set up daily, as are all other costs, such as administrative and selling salaries and expenses, interest, depletion, depreciation, bond discount and a provision for bad debts. The sinking fund provision, for the retirement of the funded debt, while not a true cost, is also included, since this item must come from profits.

These reports are made on separate sheets and only the management receives

a copy of each. The operating department heads receive only the cost statement; the sales department only the realization figures.

By deducting the total costs from the total realization, the management may at all times know the progress of the business. These statements do not require the employment of any additional help, and are so accurate that they do not show a variance of more than one-half cent per ton from actual book figures.

Any unusual costs, either daily or cumulative, are immediately recognized and steps taken to remedy, the management being in daily position to decide, from a profit standpoint, the amount that may or may not be expended.

The daily balance sheet statement is divided into three major sections, viz:

Cash on hand and in bank.....	....
Accounts receivable; shown as follows:	
Previous month carried forward.....	....
Less: Received on account to-day .....	....
Total receivable previous month.....	....
Current month, shipments to date .....	....
Shipments today .....	....
Less: Cash received on current shipments .....	....
Total receivables current month.....	....
Current obligations payable:	
Payables incurred prior to first of month .....	....
Payables current month vouchered for payment today and to date .....	....
Less: Payments made today and to date .....	....
Pay roll liability accrued to date.....	....
Less: Paid today .....	....
Interest accrued to day and to date, payable next interest date.....	....
Sinking fund accrued today and to date payable next sinking fund payment date.....	....

This daily balance sheet statement gives complete information with respect to the amount of cash necessary to meet obligations. The cash and receivables sections show where funds are available; if in receivables, the sources from which there is reasonable expectancy of collection.

Various other statements, common to all industries, are also prepared, but these need no especial comment.

DEVELOPMENT

Another item which should command the attention and study of the management and accounting departments is that of development and its place on the balance sheet. Development in the accepted sense is the driving of main and panel entries for the opening of territory in advance of immediate mining needs. The cost of driving these entries is almost without exception immediately charged to costs. Strictly speaking this is incorrect; this class of expenditures is in

the nature of a semi-capital asset and should be so treated on the books. The proper time to convert these charges into costs is when men are given new territory and rooms turned or started off the entries. The management is, or should be, jealous of the company's balance sheet and should insist on this method of treatment.

Consider, too, the possibility of the sale of the entire property, the purchaser requesting and receiving a book statement of values. Exclusion of advance development costs may cost the vendor company many thousands of dollars by reason of this oversight. The load or storage yard tracks on top might just as properly be charged to costs, but this is never the case. This method of setting up development is also an excellent check on the surveyor's reports, and provides an opportunity for the management to know what territory is being developed and the rate of progress. If too far in advance, it may be halted and men and machines put to work in rooms.

TREATMENT OF DISCARDED EQUIPMENT

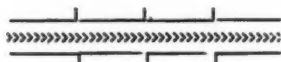
It frequently happens that machinery or equipment is taken out of service and the warehouse drawn on for replacements. The withdrawn equipment is to be repaired or rebuilt. Too frequently this discarded equipment is not returned to warehouse, with the result that the capital account is burdened with a double charge—one for the original issue and one for the replacement. The warehouse being required to keep a minimum supply on hand proceeds to have the purchasing department replenish the stock. In idle time the discarded equipment is repaired or rebuilt, and the cost of labor and supplies charged to current operating costs, further penalizing the profits.

The withdrawn equipment should immediately be charged back to warehouse at a fair price and all supplies and labor to recondition charged against this job, the total cost being warehouse inventory—a current asset on the balance sheet. In case of fire insurance recovery may be had if properly set up on warehouse records; if not, a still greater loss ensues.

VALUE OF APPRAISALS

The importance of an appraisal is frequently overlooked by both management and accounting departments. A new property is purchased for a stipulated figure. This information is passed to the accounting department, who know nothing of the transactions except that the property conveyed consists of so many acres and some equipment. From this meager information they are expected to allocate values to fee coal, royalty coal, surface lands, top works, bottom works, top and bottom equipment, load and storage tracks and miners' dwellings, and, having (Continued on page 642)

SCOPE of MECHANICAL LOADING Underground in Metal Mines



By Lucien Eaton *

THE question is often asked, "How much of our ore can we load with machines underground?" A few years ago an answer to this question would have been given with some hesitation. Now, however, we can definitely say, "Under favorable conditions all. In any case, a large percentage." A few mines are now using machines for all their loading, no hand-shoveling being required anywhere, except for a little cleaning up, and a good many mines are handling over 90 percent of the product mechanically. Some mines require very little shoveling at any time, the position of the ore-body being such that the ore as broken can be made to fall directly into chutes, and in these mines mechanical loading has only one field—that of development drifts. Although there are some mines where mechanical loading has been tried, and it has been unsuccessful for one reason or another, the successes that have already been made lead me to believe that most of these failures were unnecessary, and that a large number of mines, now using only hand labor for loading, could use mechanical loaders of some sort to advantage.

It was to be expected that those mines which have large tonnages of low-grade ore to handle, and where loading conditions are favorable for mechanical contrivances, should be the first to make a success of this kind of loading. Examples of such mines are the iron mines of the Lake Superior district in Michigan, Wisconsin and Minnesota, the iron mines of Birmingham, Ala., and the lead mines of southeastern Missouri. If the knowledge acquired in these districts should be applied to the more difficult

conditions of other districts, it is only reasonable to expect that such additional advances in the art can be made as will insure success in the undertaking.

The two greatest hindrances to the growth of mechanical loading underground have been the opposition of organized labor and the reluctance of the mine management to change the method of mining in use sufficiently to give the machines a fair chance. The conditions under which mechanical loading and hand shoveling are successfully carried out are essentially different, as mechanical loading works best when a few places can supply a large amount of ore, and hand shoveling is most successful when the work can be distributed over a larger number of smaller places. In other words, the mechanical loader is a machine of large capacity and a man is one of small capacity. It is, therefore, unreasonable to expect that the machine will work to advantage under conditions planned for hand labor. An excellent example of success obtained by changing mining methods is the Birmingham District in Alabama. In the "red ore" mines on Red Mountain the ore dips at angles of 5 degrees to 20 degrees, and it was customary to turn off headings at 65-ft. intervals along the slope. These headings were driven 35 ft. wide along the strike of the ore-bed, leaving a pillar 30 ft. wide. Under these conditions little headway was made in mechanical loading. When, however, the level interval was increased to 200 ft. or more, and rooms were driven up the slope, a much larger supply of ore was made available for each loading unit, and success was immediate and gratifying.

Mechanical loading may be subdivided according to the type of machine used

or according to the kind of work done. The loading machines may be divided into two classes, mechanical shovelers and scrapers, and the work done also may be divided into two classes—loading cars and filling chutes. The work of loading cars is primarily that of the mechanical shovelers and that of filling chutes is the special field of scrapers; but there is a considerable overlap between the two. This is especially true in the case of scrapers used for loading cars.

In the period of adjustment after the war mechanical shovelers of all sizes and of many different kinds were built at places scattered over the whole country, but these have gradually died out until there are left only a few machines that are making both a technical and financial success. These mechanical shovelers may be divided into two classes, (1) those for tunnels, large drifts and open stopes and (2) those for small drifts.

Of the larger machines the outstanding survivals are the Myers-Whaley Company loaders and the St. Joe shovel, built by the Thew Shovel Company. The first two are primarily tunneling or drifting machines, and the latter was built specially for the open stopes of the St. Joseph Lead Company in southeast Missouri; but their fields of application overlap, and the Myers-Whaley and Conway machines are successfully used in stoping. The greatest handicap that militates against all three loaders is their relatively high first cost, which limits their field of application to comparatively large operations. They are all machines of large capacity and are operated by electric power. To give the best results they must have a large supply of ore to work on and must have large cars and good car service.

The Myers-Whaley and Conway loaders are "belt machines"—that is to say, the digging element discharges its load upon a traveling belt instead of directly into the car—and the St. Joe shovel, although it does not look like one, is essentially a steam shovel of the revolving type designed especially for underground work where head room is low. The Myers-Whaley and Conway shovels, although they can be used in smaller places, work best in drifts 8 ft. by 8 ft. in cross-section or larger, and the St. Joe shovel requires a little more room. All three machines are self-propelling.

Of the second class of mechanical shovelers there remain the Hoar loader and the Butler shovel. The latter is probably the favorite and has been very successful in small drifts and tunnels. Both machines are driven by compressed air, and both are of the revolving type, operating somewhat on the principle of a steam shovel, and work best in finely broken material. Their special field is in

* The Cleveland-Cliffs Iron Company.

drifts from 6 ft. by 7 ft. up to 8 ft. by 8 ft. in cross-section. Neither machine is self-propelling, but each is light enough to be moved by hand or locomotive.

All of the mechanical shovelers described are designed to load cars not over 4 ft. high, but in most instances can be adapted to higher cars, if necessary. This is sometimes a convenience, but the best loading results are always obtained with low, wide cars of large capacity.

In recent years the greatest growth has been in the use of scrapers underground, not only for filling chutes but for loading cars. At first nearly all the scraper-hoists were driven by compressed air, but the trend has been decidedly toward electric power and toward larger units. Most of the electric motors are direct current, but in some of the largest installations alternating current is used, and I anticipate that more alternating current installations will be made in the future as the limits of the direct-current generators for electric haulage are reached. Certainly in my own experience alternating current has proved very satisfactory from the points of view of both reliability and economy.

Practically all scraper-hoists have two independent drums, one for the back-haul and one for the digging rope. Usually friction clutches are used, and the planetary transmission is very popular, but many of the large hoists have jaw clutches. The first hoists were driven by 3-hp. to 5-hp. motors, but now one seldom sees less than 7½ hp. in the North and 10, 15 and 25 hp. motors are getting more and more common. In the South the motors are larger, 25 and 50 hp. being usual.

Scrapers are of two kinds, the hoe and the box. The hoe-type scraper picks up its load quickly and works well in chunks, but on long hauls has a tendency to spill its load at the sides. This tendency can be partly overcome by adding short side-plates or by bringing the outside corners forward, thus making the digging edge slightly concave. In general, the height is one-half the width and the length one and a half times to nearly twice the width. Weights have gradually increased, now being seldom less than 400 pounds and in some instances being as much as 1,500 pounds. Widths vary from 36 in. to 60 in.

The box-type scraper does not pick up its load as quickly as the hoe, but has a greater capacity for the same width, and has less tendency to spill its load. It works best in finely broken ore, but the large sizes are loading lumpy ore successfully. Widths vary from 30 in. up to 60 in. and weights from 200 pounds to more than 3,000 pounds. I once saw an installation where the scrapers were

66 in. wide and weighed over 5,000 pounds each.

A variation of the box-type of scraper is the Crescent scraper, sold by Sauerman Bros. of Chicago. In this scraper the back is bent forward on top, so that, when the scraper is full, the load presses upwards, and causes the scraper to "ride the pile" and not bury itself. This makes it especially suitable for use in gravel-pits and coal-piles.

On account of their characteristics as set forth above, the hoe-type scraper is to be chosen for loading in the breasts of drifts, for short hauls with chunky ore, and for all places where it is desirable to pick up the load quickly; the box-type is to be preferred in loose, finely broken ore and for long hauls, where there is a firm bottom; and the "Crescent" type for large piles of gravelly material and for places where there is no bottom and where the scraper should "ride the pile."

The scraper is preeminent in top-slicing on sublevels and in mines where the dip is too great for mechanical shovels and too little to allow the broken ore to run by gravity; that is, between 5 degrees and 45 degrees. For sublevel work the smaller units, 7½ to 15 hp., are most common because of their portability. At first only straight hauls were considered practicable, but it was soon found that turns as sharp as 60 degrees can be negotiated successfully with a little ingenuity. Boards are laid on the floor, sloping outward, so that the scraper will ride away from the apex of the corner, and other boards standing on edge are nailed to the timber to keep the corners of the scraper from catching. Sometimes a vertical roller is set up at the corner, but this is not always necessary. In this way side-slices are loaded out one after another with little difficulty. One of the greatest obstacles in the way of scraping on sublevels is water. When there is a heavy flow of water, it collects in all the hollows in the floor, and the first scraperful of ore pushes it into the chute, where it causes trouble. It is impossible to keep a ditch open, because of the side-spill from the scraper, and pipes are easily clogged. One solution of the problem might be to load the ore into a car near the breast, using a temporary sectionalized slide; but I do not know that this has been given a fair trial.

One of the new developments in the use of scrapers on sublevels is a result of water conditions similar to those just described. The wet ore gave so much trouble in the chutes that the stopper-boards were entirely removed, and the ore from several chutes was allowed to run freely into a cross-cut, from which it was loaded by a large scraper into cars in the main drift. By this change the

cost for loading was cut nearly in half.

A somewhat similar application of scrapers has been their use on "transfer sublevels." When the dip of the ore-body is so flat that the drifts and raises needed to get under the ore on the upper sublevels must be driven in rock, an intermediate sublevel is opened in ore, and the ore above it is mined into raises that discharge into this "transfer" drift, and is hauled to centrally located chutes, put up from the main level. In this way much rock development is eliminated, and the loading is concentrated at a small number of points. For this work a scraper that will "ride the pile" is needed, and the hoist must have ample power.

A 25-hp. motor and a half-yard scraper are the equipment commonly used in the iron country.

When cars are filled directly, the scraper is pulled up an inclined slide and drops its load into the car through an opening in the slide or merely over the end. The secret of success is to have a plentiful supply of ore and good car service. When these conditions are provided, some of the larger units have maintained an average of 1 ton per minute loaded throughout a shift, and loading speeds of 30 tons per hour are common practice.

Two general types of slide are used. In drifts the slide is mounted on wheels, so that it is easily removed as soon as the broken rock or ore has been cleaned up. These slides vary somewhat in detail, but are nearly always modifications of the slide developed at the Osana mine in Iron River, Mich., some years ago. In one modification the scraper is pulled entirely off the slide and rides on top of the car or cars. With such equipment the breast can be cleaned out in two to three hours, leaving ample time for drilling and blasting the next round in the same shift. Some remarkable records have been made in drifting in this way. Hoists have 15 to 25-hp. motors and scrapers weigh 400 to 800 pounds.

In stoping it is more usual to have permanent or semi-permanent slides and scrapers and hoists are larger. Where possible the cars pass under the slide at right angles to the scraper's line of travel, for in this way less time is lost in switching. The best example of this arrangement are in mines where rooms are driven at right angles to the haulage ways.

I have described briefly some of the conditions under which mechanical loading is being successfully done at the present time, and have indicated in a general way the type of equipment used. There remains to be discussed the problems of loading under less favorable circumstances. I have mentioned the bad effect of excessive water on scraping on sublevels. Water causes little inconvenience in filling cars, however, and in coarse

material scrapers pick up their load under water even better than when no water is present. For this reason scrapers should be especially effective in sinking flat inclines.

On the other hand, one obstacle to mechanical loading that has as yet proved insurmountable is the presence in the ore of waste that must be sorted out. I know of but one instance where this condition is being successfully handled. Here the loader discharges upon a picking belt from which the waste is picked by hand. This seems a practical solution of the problem wherever sorting must be done over any considerable period of time. When sorting is required only temporarily, it is customary to sort on the pile, loading being interrupted periodically for this purpose, but when this is done the speed of loading is much reduced.

Probably the most widespread opportunity for mechanical loading, but one that has not been generally recognized, is in driving the small exploratory drifts of our western mines. These drifts are narrow, and the amount of rock to be loaded is small, so that the labor involved in hand shoveling is not excessive. The problem is complicated moreover in many districts by the general acceptance of the idea that cleaning out one breast constitutes a shift's work for one man. If this idea is discarded, it seems to me that mechanical loading can be successfully applied under these physical conditions by using scrapers and slides specially designed for portability rather than for capacity, and either by providing enough working places to keep the equipment busy for a full shift or by having the loading and the drilling done by the same crew. When this problem has been solved, the only places where mechanical loading in some form will not be justified will be in prospects and small mines, where the expected life will not warrant the necessary outlay for proper equipment.

The developments in the art of mechanical loading have followed very closely the principles laid down in the "Recommended Practice," adopted two years ago by the American Standards Association and sponsored by the American Mining Congress. As these principles are for the most part fundamental, it is to be expected that future development will be along the same lines. Simplicity, power, and durability will be the qualities most sought after in new equipment.

COAL MINING MANAGEMENT AND ACCOUNTING

(From page 639)

These theoretical values furnish the basis of cost elements and equally theoretical

done so, to establish depletion and depreciation rates; all this without knowing or seeing the properties.

operating statements which are periodically prepared. At the end of the fiscal year a Federal income tax return is prepared and the tax, if any, paid. So far, so good, but a few pointed questions by a field agent examining the return, none of which can be satisfactorily answered, and the company may receive a deficiency assessment. If the amount involved is large, expensive litigation is the next step, and the accounting department is severely criticized, to say the least, for this blunder and their general inefficiency.

A careful count and record is kept of the cash, receivables, payables; in fact, every item on the balance sheet, excepting the plant account, which, in a mining company, represents by far its largest and most important investment. It is indeed a paradoxical situation. Imagine a banking institution counting its stock of pennies daily and checking the hundred dollar bills once every five years.

A physical appraisal by a reputable appraisal company should be made and kept current. Much trouble and time could be spared and possible huge losses avoided in case of destruction by fire or storm. Loss adjustments are made from available information. If made on the theoretical basis previously referred to, the management may find themselves in possession of a claim settlement check which will represent one-half or one-third the cost of reproduction.

In the event of a sale, an appraisal will do more to establish values and selling price than all the books of the company or the persuasive powers of the management.

If and when an appraisal is made the accounting department should be required to set up a complete plant ledger to enable proper determination of depreciation costs, proper write-outs for property disposed of or abandoned and, above all, to show true values on the balance sheet.

WORKMEN'S COMPENSATION

A number of coal-operating companies are self-insurers with respect to workmen's compensation. Accidents are bound to occur around a coal mine, some of them quite serious. Awards are made by the Industrial Commission when not settled directly. The award may be for a stipulated amount, payable over a long period or even during the entire life of the injured employee.

As the business grows and gets older, these unpaid awards begin to pyramid. Some, but not all, companies are content to charge to costs only the actual payments made during the year, and these may suddenly find themselves with a liability running into the thousands with no provision or reserve to cover. When this happens the profit for the year or the accumulated surplus receives a severe body blow and self-insurance in

the mind of the management is a dismal failure. The accounting department, with the approval of the management, should set aside or reserve a certain amount per ton or an estimated total liability provision charging the monthly costs with this amount. This reserve should be sufficient to cover the total award liability, medical, legal and sundry costs, and all payments charged against this fund. The operating department, being limited to a maximum per ton allowance, will in most cases, bend their energies toward the prevention of accidents and to lower their compensation costs.

APPLICATION OF FUNDS STATEMENTS

Last, but of major importance in the many matters where the accounting department can show its efficiency and worth, is in the monthly preparation and presentation of the seldom used "Application of Funds Statement." The age-old question of the management, "Where does the money go?" is easily and simply answered by this statement, which in importance ranks or outranks even the balance sheet. The balance sheet is a still picture of the business at given moment; the following moment it is changed and obsolete. The "Funds Statement," on the other hand, is a picture of the entire period under review in narrative form. If properly prepared, it will reveal many things to the management, including their own errors, and when it does steps may be taken to prevent a recurrence.

BENEFICIATION OF DOMESTIC LOW-GRADE CHROMITE ORES

In view of the dependence of the United States on foreign countries for chromite, a study of methods for beneficiating domestic low-grade ores is being conducted by the Bureau of Mines. In a recent year the United States consumed 60 percent of the world's production of chromite and produced none. The uses of chromium are rapidly expanding, and a dependable supply is essential to American industries. This country has only small amounts of chrome ore of high enough grade to meet present trade requirements.

Report of Investigations 2999, just issued by the Bureau of Mines, is the first of a series dealing with an investigation of chemical methods of treating chromite and the possible application of these methods to the utilization of low-grade domestic ores. The series will include a study of methods of roasting chromite to obtain chromates, leaching the calcine, purification, etc.

The present paper deals with the reactions involved in the roasting and leaching operations with reference to the effect of various common impurities, reagents employed, and conditions during roasting and leaching.

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Pleasure craft along part of Washington's water front



The U. S. Supreme Court Room in the Capitol Building

National Photo

WHILE Congress during the session which ended on July 3 disposed of a large amount of legislation, it will face a heavy calendar of business when it reconvenes on December 1 next. Of outstanding interest was the enactment of the tariff revision bill which was finally approved by Congress and the President in the middle of June, after it had been pending since January 7, 1929.

The calendars of both the Senate and House are crowded with other measures for action at the next session. There are also many bills pending before the committees of both Houses.

Effort will be made in the next session to dispose of the long pending and much controverted Muscle Shoals legislation. Conference committees of the Senate and House were unable at the last session to adjust the differences between the separate measures passed by both bodies and the measure was still in conference when the session closed. The Senate bill provides for Government operation of this power and nitrate project, while the House provided for its lease to private parties. Another bill held over by the conference committee provides for advance planning and regulated construction of public works to stabilize industry and prevent unemployment. It provides for a Federal allotment of not more than \$150,000,000 in any one year for construction work.

Including the extra session which began April 15, 1929, Congress has had a record number of bills before it for consideration. The total in both House and Senate is 19,384. These included 13,313 bills and 734 resolutions in the House and 4,782 bills and 555 resolutions in the Senate. Reports were made on 2,064 bills in the House and 1,163 in the Senate. The number of laws enacted was 925.

The following bills await action by the House, having been reported by its

LEGISLATIVE REVIEW



various committees: To establish an assay office at Dahlonega, Ga.; to create a division of safety in the Department of Labor; to establish a national employment system in cooperation with the states; for conservation and operation of the naval petroleum and oil shale reserves by the Navy; to apply the immigration quota restriction law to countries of the Western Hemisphere; to suspend the authority of the Interstate Commerce Commission to approve railroad consolidations pending an investigation of holding companies; to pay a claim of the Mack Copper Company for use of its land in California as an Army camp during the war; to pay claims of the Orange, Tex., Car & Steel Co., the Concrete Steel Co. and the Pocahontas Fuel Co.; to carry out an award of the National War Labor Board in 1919 in favor of increased pay to employees of the Minneapolis Steel & Machinery Co., and others; and to compromise a suit arising out of the forfeiture of a contract of the Commercial Coal Co. with the District of Columbia in 1916.

SILVER CONFERENCE

The principal item of public business on the Senate calendar is a resolution by Senator King, of Utah, requesting the President to confer

with representatives of foreign countries looking to the calling of an international conference to consider plans to increase the use of silver for monetary and other purposes. The silver situation is also expected to be considered in connection with appropriations for the Department of Commerce.

Senator Oddie, of Nevada, has requested Secretary of Commerce Lamont to provide in future budgets for increased allotments to the Bureau of Mines, Bureau of Standards, and Bureau of Foreign and Domestic Commerce for investigations looking to new uses for silver and its appreciation in price. The new session will consider these and other appropriation requests for all of the Government departments for the year beginning July 1, 1931.

Effort will be made by advocates of legislation to secure action on a bill to forbid the courts from issuing injunctions in labor disputes. This bill has been unfavorably reported from the Senate Judiciary Committee. Its chairman, Senator Norris, of Nebraska, unsuccessfully tried at the close of the last session to have the Senate definitely assign this bill for discussion early in the next session.

Tariff and taxation measures are likely to be considered by Congress in the new session. The House Ways and Means Committee, which must originate such legislation, deferred until the December session a bill by Representative Brumm, of Pennsylvania, to bar anthracite from Russia because it is mined by convict or forced labor, pending investigation and report by various Government departments on the proposal.

Representative Hawley, of Oregon,

Legislative Review

chairman of the committee, has announced that the Joint Congressional Committee on Internal Revenue Taxation, of which he is also chairman, will give hearings to the industry and the Treasury Department in December on the proposed percentage plan for determining mine depletion. Senators Oddie, of Nevada, and Dill, of Washington, recently advocated revision of the present depletion system and suggested the percentage principle. There is also a possibility of further reduction in corporation and individual income tax rates should a surplus of Government receipts over expenditures justify.

CONGRESS INQUIRIES

During the time between now and December a number of special congressional committees will conduct investigations. These include the following: Holding companies in the railroad industry, by the House Committee on Interstate Commerce; railroad consolidations, by the Senate Committee on Interstate Commerce; the Alaskan Railroad, by a special Senate committee; to reduce profits in war, by a commission consisting of Senators, Representatives, and Cabinet officers; affairs of the Indians, by the Senate Indian Committee; to establish additional national parks, by the Senate Public Lands Committee; and communist propaganda, by a special committee of the House.

The naval appropriation bill for the year beginning July 1, 1930, as passed by Congress and approved by the President, provides \$175,000 for operation and conservation of the naval petroleum reserves. Of this amount \$100,000 is for repairs to shut-in wells on reserve No. 1. Ten million dollars is also provided for protection of this particular reserve by drilling wells and performing work incident thereto. This fund is not to be spent, however, if a satisfactory agreement can be made with adjoining land owners not to drill offset wells for the purpose of producing oil.

For coal and other fuel for the Navy \$9,600,000, and for the Marine Corps \$500,000 are provided. An appropriation of \$166,000 is to be transferred by the Navy in advance to the Bureau of Mines for procuring helium for airplane use. The following funds are available for construction work at navy yards and stations: Boston power plant, \$68,000; New York power plant, \$24,000; District of Columbia navy yard boiler plant, \$120,000; Norfolk electric system, \$50,000; Mare Island, Calif., power plant, \$132,000; Hampton Roads, Va., fuel oil storage, \$90,000; Cuban oil storage, \$18,000; Philippine Island power plant,

\$28,000; St. Juliens Creek, Va., steam system, \$54,000; Newport, R. I., power plant, \$28,000; Great Lakes, Ill., power plant, \$72,000; San Diego, Calif., fuel oil storage, \$65,000, and electric system, \$70,000; Lakehurst, N. J., gasoline storage, \$12,000; District of Columbia air station electric system, \$20,000; Pensacola, Fla., power plant, \$162,000.

LAWS PASSED

Laws passed at the recent session included the following: Extending the mining patent law to Government coal lands in Alabama; sale of coal deposits and lease of oil and gas on lands of the Choctaw and Chickasaw Indians in Oklahoma; unit development of oil and gas pools under the leasing law; oil and gas leases in or under railroad and other rights of way; monthly reports on employment in the mining industry by the Department of Labor; and creating a new Federal Power Commission.

The deficiency appropriation act makes available for the year beginning July 1, 1930, the balance of prior appropriations of \$190,000, and a new appropriation of \$40,000 for protecting the interests of the Government in the naval oil reserves. For the establishment in the Bureau of Standards of a national hydraulic laboratory, \$350,000 is provided. The Federal Power Commission is given \$111,920 in addition to a previous appropriation, and \$20,000 is made available for expenses of an American delegation to an international conference on load lines for vessels, at London. For investigation of the development of electric power from the movement of the tides in Passamaquoddy and Cobscook Bays, on the American-Canadian border, \$22,500 is provided.

In providing for the purchase of land and the construction of a post office at Nanticoke, Pa., at a cost of \$70,000, the Treasury Department is authorized to accept title to the land with a reservation to the owner of the coal or other minerals therein, with right to mine them.

CANAL OPERATION

The river and harbor act requires the War Department to accept from the State of New York title to the Erie and Oswego Canals and to operate them at an estimated annual cost of \$2,500,000 as barge canals, but not to the injury of the proposed St. Lawrence waterway from the Great Lakes to the Atlantic.

The following is a summary of recent action by Congress on legislative proposals:

S. Res. 296. Mr. King (Dem., Utah). This resolution proposes an international silver conference, designed to increase the price of silver. It provides as follows:

"WHEREAS the United States is a large

producer of silver, and in its production many thousands of American citizens find employment; and

"WHEREAS the Government of the United States has in its Treasury silver bullion valued at more than six and one-half million dollars; four hundred and ninety-four million coined silver dollars; against which silver certificates have been issued, and silver coins, consisting of half and quarter dollars and dimes, of the face value of more than five million dollars, and has in circulation more than thirty-eight and one-half million silver dollars, and silver half dollars, quarter dollars and dimes of the face value of more than two hundred and eighty-one million dollars, all of which were purchased at prices much higher than those now prevailing for silver bullion, and any further decline, measured by gold, in the price of silver will result in additional losses to the Government; and

"WHEREAS the use of silver in trade and commerce and for monetary purposes is essential, not only in the United States but throughout the world; and

"WHEREAS a considerable part of the foreign trade of the United States is with countries in which silver is extensively used as a medium of exchange, and if the price of silver is further depressed the purchasing power of many countries will be materially reduced to their injury, as well as to the injury of the United States; and

"WHEREAS China and India, which represent more than one-half of the world's population, have been the principal consumers of silver, and any policy that will further depress the price of silver or prevent its advancement to normal levels will injuriously affect the economic and industrial condition of the United States, as well as of other countries; and

"WHEREAS it will be advantageous for the United States to expand its foreign trade and commerce, and particularly to find markets for its surplus products in the Orient and in all silver-producing countries, such as Canada, Mexico, Bolivia, and Peru; and

"WHEREAS efforts are being made to induce China to demonetize silver and adopt a fiscal policy calling for a new currency based upon a gold standard fund, and to further debase silver and curtail its use in India, which said efforts, if successful, will result in a further destructive decline in the price of silver, and in economic and industrial injury not alone to silver-producing countries but to all countries of the world; and

"WHEREAS it is important, not only to countries producing silver but to all countries engaged in trade and commerce, that measures be adopted to avert the disastrous consequences that will inevitably follow a further decline in the price of silver, and to secure an international agreement, or the adoption of an international policy that will stabilize the price of silver and obtain for it a suitable status in the monetary systems of the world; and

"WHEREAS it is believed by many persons that an international conference should be called for the purpose of considering and taking action upon the question herein referred to: Therefore

"Resolved, That the President of the United States be requested to confer with such governments as he may deem

proper and through such agencies as he may see fit, for the purpose of ascertaining whether economic and other conditions are propitious for the convening of an international conference to consider and devise plans to increase the use of silver for monetary and other purposes, and to bring about the stabilization of the price of silver; and be it further

"Resolved, That the President be requested to inform Congress of his proceedings hereunder and the results thereof."

MONETARY COMMISSION

S. J. Res. 204. Mr. Pine (Rep., Okla.). This resolution would create a National Monetary Commission to investigate and report on the monetary system of the country with proposed legislative changes. It would consist of 12 Senators and 12 Representatives, representing each Federal reserve district. The commission would investigate the following: Whether the nation's financial system can be safe, stable, and sound when based on a gold supply which is less than the resources of two banks; ways of meeting the needs of commerce, industry, and agriculture through the Federal reserve system; to maintain an equitable distribution of credit and prevent inflation and deflation; to enable the Government to expand and contract credit so as to guarantee stable business conditions and a stable price level; effect on general business of inflation and deflation of credit by banks; and the effect on business conditions in the United States by the withdrawal of billions of dollars for foreign investments. *Banking and Currency.*

H. R. 12802. Mr. Eaton (Rep., Colo.). This bill proposes to amend the law concerning annual assessment work upon oil-shale lands to provide as follows:

"AS TO LANDS VALUABLE FOR OIL SHALE, THE ANNUAL EXPENDITURE OF \$100 IN LABOR OR IMPROVEMENT SHALL BE SOLELY A QUESTION BETWEEN THE APPLICANT FOR PATENT AND ANY CITIZEN CLAIMING AN ADVERSE RIGHT TO THE SAME MINERAL LAND, AND NO LACK OR OMISSION THEREOF SHALL BE MADE THE BASIS OF ANY CONTEST OR ADVERSE PROCEEDING, WHETHER HERETOFORE OR HEREAFTER COMMENCED AGAINST SUCH CLAIMS BY THE UNITED STATES." *Public Lands.*

H. R. 13111. Mr. Eaton (Rep., Colo.). This bill is similar to the foregoing, and provides that the Secretary of the Interior shall issue patent to applicants for oil-shale lands upon whose application had been completed on or before the effective date of this act. *Public Lands.*

H. R. 13191. Mr. Eaton (Rep., Colo.). This is of similar character, and provides:

"That upon payment of all money due the United States by applicants for patents for oil-shale lands against whom

no fraud is charged, and upon whose applications for patent the period of publication was completed on or before June 27, 1930, and upon which the patent work is sufficient, or is made sufficient within 90 days after the effective date of this act, the Secretary of the Interior is authorized and directed to forthwith issue patents upon all such entries for oil-shale lands."

H. R. 247. This bill proposes to validate mineral land entries of the Hammon Consolidated Gold Fields Corporation, Andrew Anderson and Fred M. Johnson, in Alaska. *Passed by the House.*

H. R. 12397. This bill, recommended by the Treasury Department, proposes to increase the penalties for offenses against the currency of foreign countries to conform to those against American currency. *Passed by the House.*

S. Res. 261. Mr. Oddie (Rep., Nev.). To authorize the Mines and Mining Committee to revise its former report on foreign currency and exchange. *Expenditures.*

COAL LANDS

S. 4119. This bill applies section 2455, Revised Statutes, to coal lands in Alabama. *Enacted into law.*

S. 4140. This bill authorizes the sale by the Interior Department of coal and asphalt deposits on lands of the Choctaw and Chickasaw Indians in Oklahoma. *Enacted into law.*

S. 4657. Mr. Nye (Rep., N. Dak.). This bill proposes to authorize cooperative or unit development of oil and gas pools as recommended by the Federal Oil Conservation Board. It provides for amendment of sections 17 and 27 of the leasing law of 1920 to carry out this purpose. The bill is designed to more properly conserve the natural resources of any single oil or gas pool or field, and authorizes permittees and lessees under the leasing law to unite in operating



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Legislative Review

under a cooperative or unit plan of development or operation of the pool when determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest. To assure continuous protection of the public, the terms and operation of any such unit plan shall at all times be subject to the approval of the Interior Secretary, who, by the legislation, "is authorized in his absolute and uncontrolled discretion to establish, alter, change, or revoke drilling, producing and royalty requirements, and otherwise to make regulations in connection with the institution and operation of any such cooperative or unit plan." Any lease heretofore or hereafter issued that has become the subject of a cooperative or unit plan of development, and having the approval of the Interior Secretary, shall continue until termination of the plan and not be subject to the present 20-year limit. The new bill permits oil and gas leases to be held by one person to 7,680 acres in any state and 2,560 acres in a geologic structure of the same producing field, in contrast to the present law which restricts each person to three oil or gas leases in a state and one in a producing field. A change is also proposed regarding leases or permits to coal, phosphate, and sodium lands. The bill authorizes any one person to hold 2,560 acres of such lands in any one state, while the present law restricts the holdings to one lease. *Enacted into law.*

MINE LEASES

S. 4707. Mr. Frazier (Rep., N. Dak.); H. R. 12921. Mr. Leavitt (Rep., Mont.). These bills authorize the leasing of unallotted Indian lands for mining purposes. *Indian Affairs.*

S. 4164. Mr. Nye (Rep., N. Dak.). This bill provides for repayment of rents and royalties under the leasing law in excess of the lawful requirements. *Enacted into law.*

H. R. 12482. Mr. Stone (Rep., Okla.). This bill would forbid the importation of crude or refined petroleum into the United States. Provision is made, however, for the importation of crude oil for refining in this country, provided the products are exported and not sold here. *Ways and Means.*

H. R. 11334. Mr. Carter (Rep., Wyo.). This bill authorizes the Interior Department to grant oil and gas prospecting permits and leases to certain land in Wyoming. *Public Lands.*

S. 2864. This bill proposes to refund \$15,000 to the Kinney Coastal Oil Company and \$2,495 to the Castle Oil Company, which was paid for the purchase of oil and gas leases in Wyoming, but

Legislative Review

for which exclusive possession could not be delivered by the Interior Department. *Enacted into law.*

H. Res. 226. Mr. Patman (Dem., Tex.). This resolution proposes an investigation and report by February 1 next by a special committee of five members of the House as to alleged violation of the antitrust laws by reason of operations of recent trade practice agreements. The resolution provides for investigation of the following charges:

That the petroleum-oil companies of America and the large oil companies of the world have entered into agreements to set the prices that individuals and small independent companies may receive and the consumers must pay for gasoline and other petroleum-oil products in the United States; that said agreements are in writing, the names of the companies entering into them are known, and the agreements are in plain violation of the laws of the United States; that the Attorney General, notwithstanding this convincing evidence which has been called to his attention, has failed and refused to take any action having for its purpose the destruction of this combination and the punishment of these conspirators against the public interest.

That the Attorney General refused to advise a member of Congress as to whether or not agreements entered into by a trade association were in violation of the law, with the excuse that the "acts of Congress provide that the Attorney General shall give opinions only to the President and the heads of executive departments and independent Government bureaus"; that said Attorney General at the time he refused to advise a member of Congress was freely advising with representatives of illegal combinations and trusts who were endeavoring to get concessions from the Government through his department that would permit said illegal combinations to set the prices of necessities and conveniences of life; that the Attorney General has freely advised with representatives of illegal combinations who desired recognition of certain loopholes in the antitrust laws from his department; that policy so pursued by the Attorney General is detrimental and destructive of the rights of the public and is using his office as an agency of convenience for private and unfair trusts and greedy monopolies.

That the Attorney General has had called to his attention the fact that 50 or more trade practice conferences have been held by the Federal Trade Commission for representatives of so many different industries, and that at said conferences resolutions were passed which were in direct and positive violation of the laws of the United States; that so far as is known said resolutions are now effective as between the members of each industry and are being complied with, and that the Attorney General has already failed and refused to do his duty by prosecuting the offending parties.

That the Department of Justice never brings any kind of suits against illegal

and unlawful combinations in restraint of trade, price-fixing organizations, and monopolistic organizations except what are known as friendly suits; that said department so handles said suits that in the event the offending parties lose and the Government wins no one will be compelled to pay a fine or go to jail; that there is no effort on the part of the Department of Justice to enforce the antitrust laws, but a tendency by said department to permit their violation with the implied, if not expressed, understanding that suits will not be instituted or prosecutions commenced that will require the payment of fines or the serving of jail or penitentiary sentences.

That the Attorney General has received convincing evidence that trade associations operating under their assumed cloak of legality thrown about them by the Federal Trade Commission have been and are now violating the antitrust law, and he has failed and refused to take any legal action whatsoever against the guilty individuals and concerns.

That trusts and monopolies are being formed for the purpose of controlling the prices of all the commodities necessary for the comfort and convenience of life and the Attorney General is not taking an effective stand against their organization, but on the other hand, by reason of his inaction, acquiescence, public statements, and in other ways, said monopolies and trusts are encouraged. *Judiciary.*

S. J. Res. 202. Mr. Thomas (Dem., Okla.). This resolution requests the President to call an international conference for the purpose of surveying their economic barriers, with a view of promoting the sale of surplus mineral products of the United States. *Agriculture.*

OIL RESERVES

H. R. 13158. Mr. Hale (Rep., N. H.). This bill provides for the conservation and operation of the naval petroleum and oil-shale reserves by the Navy. *Reported by Naval Committee.*

S. Res. 310. Mr. Tydings (Dem., Md.). This resolution provides for American control over Antarctic areas discovered or explored by Americans. The Senator says they may contain gold, coal, copper, or other valuable minerals.

S. 4780. Mr. Pine (Rep., Okla.). This bill would establish a branch of the Interior Department at Muskogee, Okla., in charge of an Assistant Secretary of the Interior. *Indian Affairs.*

S. Res. 287. This resolution provides for an investigation and report by the Interior Department and the Commission on Conservation and Administration of the Public Domain as to lands which may be devoted to the use of homeless Indians. *Passed by Senate.*

S. J. Res. 165. For settlement out of court of the suit in the Delaware District Court of the Government against the Sinclair Crude Oil Purchasing Company. *Enacted into law.*

H. R. 9939. Authorizes oil and gas leases on lands of the Choctaw and

Chickasaw Indians in Oklahoma. *Enacted into law.*

H. J. Res. 244. To invite the states and foreign countries to participate in an international petroleum exposition at Tulsa from October 4 to 11. *Enacted into law.*

S. 317. Authorizing oil and gas prospecting permits or leases to certain lands in Wyoming. *Enacted into law.*

S. 4166. Mr. McNary (Rep., Oreg.). This bill proposes to authorize the Secretary of Agriculture to permit the use of national forest lands by permit or lease for the purposes of industry, commerce, etc., for not more than 30 years and for areas of not more than 160 acres. *Agriculture.*

H. R. 11637. Mr. Haugen (Rep., Iowa). This is similar to the foregoing.

H. Res. 230. Mr. Haugen (Rep., Iowa). This resolution authorizes the Committee on Agriculture to investigate the national forests to obtain information for consideration of legislation with reference to the Government's activities in the forests. *Rules.*

S. 4308. Mr. Bratton (Dem., N. Mex.). This bill authorizes patents to lands in New Mexico which have been held under claim or color of title for more than 20 years, upon payment of \$1.25 per acre. *Passed by the Senate.*

S. Con. Res. 23. Mr. Wagner (Dem., N. Y.). This resolution proposes to set aside the first week in April each year to be celebrated as American Conservation Week. *Passed by the Senate.*

H. Con. Res. 32. Mr. Colton (Rep., Utah). This is similar to the foregoing. *Judiciary.*

S. Res. 263. This resolution continues until March 4, 1931, the investigation of Indian affairs by the Senate Indian Committee. *Passed by the Senate.*

S. Res. 252. This resolution continues until March 4, 1931, the investigation by the Senate Committee on Public Lands as to the establishment of additional national parks. *Passed by the Senate.*

S. Res. 282. Mr. Steiwer (Rep., Oreg.). This resolution provides for an investigation by the Senate Indian Committee of nontaxable Indian lands, to cover the relationship between the Federal Government and the governments of the several states and political subdivisions in which there are located Indian reservations or unallotted Indian tribal lands, or any other Indian lands which are not subject to taxation by such states or political subdivisions, with a view to developing a plan by which the United States may make a fair and equitable contribution toward the expenses of carrying on governmental activities in said states and political subdivisions. *Reported by Indian Committee.*

S. 2801. For an investigation of all phases of taxation relating to agricul-

ture by the Department of Agriculture. *Passed by Senate.*

H. R. 2667. Mr. Hawley (Rep., Oreg.). This is the revised tariff bill which was under consideration for nearly 18 months. It replaces the tariff law of 1922. *Enacted into law.*

TARIFF INQUIRIES

S. Res. 309. Messrs. Copeland (Dem., N. Y.) and Reed (Rep., Pa.). This resolution calls on the Tariff Commission for a report on the domestic and foreign production costs of pig iron. *Passed by Senate.*

S. Res. 295. Mr. Borah (Rep., Idaho). This resolution calls on the Tariff Commission for a report on the domestic and foreign production costs of wire fencing and netting, cement and certain agricultural tools. *Passed by Senate.*

H. Res. 242. Mr. Sproul (Rep., Kans.). This resolution provides for investigation and report by the Federal Trade Commission next December as to the economic effects of business combinations, mergers, or consolidations. *Interstate Commerce.*

H. R. 12810. Mr. McKewen (Dem., Okla.). This bill would forbid any person or corporation from acquiring more than 49 percent of the distribution of any commodity in interstate commerce. *Judiciary.*

S. J. Res. 161. This resolution would suspend the authority of the Interstate Commerce Commission to approve consolidations of railroads, in order that Congress might investigate the extent to which railroads are held by holding companies. *Passed by the Senate and reported by the House Committee on Interstate Commerce.*

H. Res. 274. Mr. Parker (Rep., N. Y.). This resolution appropriates an additional \$25,000 to the \$25,000 previously provided for an investigation by the House Committee on Interstate Commerce as to railroad holding companies. *Passed by House.*

S. Res. 298. Mr. Howell (Rep., Nebr.). This resolution provides for an investigation by three Senators as to the operation, economic situation and the prospects of the Alaskan Railroad. The resolution was passed by the Senate and the investigation will be conducted by Senators Howell, Thomas of Idaho, and Kendrick of Wyoming.

S. Res. 290. Mr. Couzens (Rep., Mich.). This resolution authorizes the Senate Committee on Interstate Commerce to investigate the consolidation of railroads and their effect upon the public, as a basis for legislation. *Passed by the Senate.*

H. Res. 220. This resolution authorizes an investigation by a committee of five members of the House as to communist propaganda in the United States, and

particularly in educational institutions; the activities and membership of the Communist Party of the United States; and all affiliated organizations and groups thereof; the ramification of the Communist International in the United States; the Amtorg Trading Corporation; the Daily Worker, and all entities, groups, or individuals who are alleged to advise, teach, or advocate the overthrow by force or violence of the Government of the United States, or attempt to undermine our republican form of government by inciting riots, sabotage, or revolutionary disorders. This resolution was passed by the House and the committee, consisting of Representatives Fish (Rep., N. Y.), Nelson (Rep., Me.), Bachmann (Rep., W. Va.), Hall (Dem., Miss.), and Eslick (Dem., Tenn.) is conducting the investigation.

PROFIT CONTROL

H. J. Res. 251. This resolution authorizes an investigation and report by December, 1931, by a commission consisting of four Senators, four Representatives, and the Secretaries of War, Navy, Agriculture, Commerce and Labor and the Attorney General as to amending the Constitution to provide that private property may be taken by Congress for public use during war, and methods of equalizing the burdens and to remove the profits of war, together with a study of policies to be pursued in event of war. The commission shall not consider or report upon the conscription of labor. *Enacted into law.*

The congressional members appointed on this committee are: Senators Reed, of Pennsylvania; Vandenberg, of Michigan; Robinson, of Arkansas; and Swanson, of Virginia. Representatives Hadley, of Washington, Holaday, of Illinois; Collins, of Mississippi; and McSwain, of South Carolina.

H. J. Res. 305. This resolution appropriates \$20,000 for expenses of American

Legislative Review

delegates to an international conference on load lines, in London. *Enacted into law.*

H. R. 12284. Mr. Crosser (Dem., Ohio). This bill appropriates \$650,000 for construction of Coast Guard vessels for rescue work on Lake Erie. *Passed by the House.*

H. J. Res. 360. Mr. LaGuardia (Rep., N. Y.). This resolution authorizes the President to call a conference of two delegates from each state to consider uniform state labor and welfare laws as a solution of the unemployment problem. The conference would consider proposed model state laws on daily hours of service and the number of days in a working week, factory regulations and other subjects relating to labor conditions. *Judiciary.*

H. R. 995. This bill proposes to create a division of safety in the Department of Labor. *Reported by the Committee on Labor.*

S. 2497. Mr. Shipstead (F. L., Minn.). This bill would forbid courts from issuing injunctions in labor disputes. *Adversely reported by the Judiciary Committee.*

S. 3059. Mr. Wagner (Dem., N. Y.). This bill provides for advance planning and regulated construction of public works to stabilize industry and prevent unemployment. It authorizes a Federal appropriation of \$150,000,000 for public construction projects in any one year. *Passed by Senate and House and pending in conference committee to adjust amendments.*

S. 3060. Mr. Wagner (Dem., N. Y.). This bill would establish a national employment system in cooperation with the states. *Passed by Senate and reported by House Judiciary Committee.*

S. 3061. Mr. Wagner (Dem., N. Y.). This bill authorizes the Department of Labor to collect and publish monthly statistics as to the number of persons employed, wages paid, and hours of employment in the mining, quarrying, and petroleum production industries. *Enacted into law.*

S. J. Res. 49. This resolution, formerly passed by the Senate, to provide for Government operation, was amended by the House to authorize the President to appoint a board to negotiate leases for the Muscle Shoals, Ala., nitrate and power project. *Passed by the House, and pending in conference committee.*

POWER SALE

S. Res. 803. Mr. Black (Dem., Ala.). This resolution provides that pending enactment of legislation for disposition of power generated by the Government power plant at the Muscle Shoals proj-



An approach to a Washington park

Legislative Review

ect, the War Department shall not discriminate against cities in the sale of such power. It is provided that the power shall be sold to the cities applying for it on as liberal terms and conditions as power is sold to private power companies. *Passed by Senate.*

S. J. Res. 205. Mr. Norris (Rep., Nebr.). This resolution is similar to the foregoing, providing for the sale of power subject to termination on a year's notice to states, counties, cities, public organizations, private corporations and individuals. *Passed by Senate.*

H. Res. 273. Mr. Hill (Dem., Ala.); H. Res. 276. Mr. Almon (Dem., Ala.). These are similar to the foregoing. *Military Affairs.*

S. J. Res. 86. This resolution authorizes the President to appoint a commission to investigate and report by December 1 as to the adequacy of unskilled agricultural labor and the sources from which obtainable, as a basis for possible immigration restriction legislation. *Passed by Senate.*

H. J. Res. 243. This resolution appropriates \$45,000 for a joint investigation by the United States and Canada as to the effects of proposed developments to generate electric power from the movement of the tides in Passamaquoddy and Cobscook Bays. *Enacted into law.*

H. R. 8299. This bill appropriates \$350,000 for establishment of a national hydraulic laboratory in the Bureau of Standards. *Enacted into law.*

S. 3619. This bill would create a new Federal Power Commission of five members to be appointed by the President in place of the present commission, which consists of three members of the Cabinet. *Enacted into law.*

H. R. 11575. Mr. Chalmers (Rep., Ohio). This bill authorizes the War Department to improve for purposes of navigation and the development of power the Thousand Islands section of the St. Lawrence River from Tibbetts Point, on Lake Ontario, to Ogdensburg, N. Y., and Prescott, Ontario. *Rivers and Harbors.*

S. 4370. Mr. Vandenberg (Rep., Mich.); and H. R. 12199. Mrs. Kahn (Rep., Calif.). These bills propose an appropriation of \$4,500,000 for the construction of a 100-ton metal-clad airship with a speed of 100 miles per hour for use by the Army Air Corps, the purpose being to further the development of the art of metal-clad airship construction. *Military Affairs.*

S. 51. Mr. Harris (Dem., Ga.). This bill proposes to apply the

quota immigration restriction law to Mexico which would have the effect of reducing immigration from that country to the United States from 58,000 to 1,900 persons per year. The Senate had previously defeated a bill applying this law to all countries of the Western Hemisphere, but the bill as amended to apply to Mexico only was subsequently passed by the Senate.

H. R. 13110. Mr. Johnson (Rep., Wash.). This bill proposes a 50 percent yearly reduction in the number of immigrants coming to this country. *Immigration.*

IMMIGRATION RESTRICTION

H. J. Res. 385. Mr. Cable (Rep., Ohio). This resolution would authorize the President to prohibit, either wholly or in excess of specified numerical limits and either permanently or for a specified period, the immigration of aliens of any occupation in any case desirable on account of the economic, industrial, or other conditions existing in the United States. *Immigration.*

H. R. 10416. This bill authorizes the construction of immigration service buildings along the Canadian and Mexican borders to provide better facilities for enforcing the customs and immigration laws. The buildings are not to cost more than \$6,000 each. *Enacted into law.*

H. R. 11204. This bill establishes a U. S. Border Patrol in the Treasury Department to more effectively regulate the entry of persons into the United States. To this new agency would be transferred the border patrol forces now operated by the Immigration Bureau of the Department of Labor and the Customs Bureau of the Treasury Department. *Passed by House.*

H. R. 9707. This bill authorizes the town of Ketchikan, Alaska, to issue \$1,000,000 worth of bonds for acquiring and operating public utilities of the Citizens Light, Power and Water Company. *Enacted into law.*

H. R. 12923 and 12996. These bills authorize the following construction proj-

ects at army posts: Carlisle, Pa., heating plant, \$80,000; Middletown, Pa., and Montgomery, Ala., heating plants, \$50,000 each. Oil and gas storage plants: Shreveport, La., \$10,000; District of Columbia, \$3,000; San Antonio, Tex., three projects, \$38,000; Hampton, Va., \$10,000; Riverside, Calif., \$5,000; Fort Bliss, Tex., \$7,654. *Enacted into law.*

S. 3088. This bill proposed to repay to R. B. Miller \$2,500 on account of excess freight rates on shipments of manganese from Virginia to Pennsylvania and Alabama during the War. *Passed by the Senate.*

H. R. 2175. This bill proposes to pay \$16,600 to the Great Western Coal Mines Company as a refund of purchase money paid in connection with a coal land entry. *Passed by the House.*

S. 3284. This bill proposes to pay \$2,903 to the Buck Creek Oil Company of Wyoming, representing excess payments of rentals and royalties. *Enacted into law.*

H. R. 8461. This bill proposes to pay \$10,150 to the Concrete Steel Company on account of a Government war contract. *Reported by the Committee on War Claims.*

H. R. 12583. Mr. Coyle (Rep., Pa.). This bill proposes to carry out an award of the National War Labor Board in 1918 in favor of increased wages to employees of the Bethlehem Steel Corporation.

S. 4494. Mr. Shipstead (F.-L., Minn.). This bill proposes to carry out an award of the National War Labor Board in 1919 in favor of increased pay for employees of the Minneapolis Steel and Machinery Company and others. *Claims.*

H. R. 12911. Mr. Johnson (Rep., Ind.). This bill proposes to pay \$13,013 to the Lower Vein Coal Company, of Terre Haute, representing excess income tax payments for 1913, 1916, and 1918.

S. 4307. This bill provides for payment of \$7,000 to the District of Columbia Government by a bonding company to settle a suit of \$19,800 for forfeiture by the Commercial Coal Company of a contract with the District in 1916. *Passed by the Senate.*

AGGLUTINATING POWER OF WASHINGTON COALS

Agglutinating tests are being made on samples of coal from every mine in the State of Washington as a part of a survey being conducted by the Northwest Experiment Station of the Bureau of Mines, Seattle, Wash., in cooperation with the University of Washington. The Marshall and Bird test for measuring the agglutinating power of coal gave an agglutinating value for 21 of the 61 samples collected. The range of values is from 120 to 12,680.



Part of the panorama of the Potomac that Washington had from his home

PRACTICAL OPERATING MEN'S DEPARTMENT

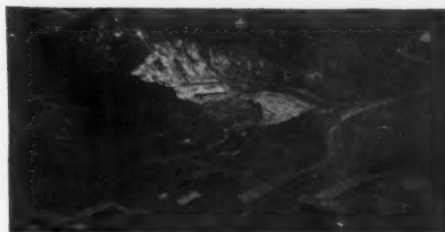


METALS

GUY N. BJORGE

Editor

Practical Operating Problems
of the Metal Mining Industry



Mine Fire Prevention and Fighting

A discussion of the Code of American
Standards for Fire Prevention and Fighting
proposed by The American Mining Congress

By Oscar A. Glaeser *

A CODE of standards for the prevention of and fighting of mine fires to be of value must be practical and must include every phase of fire prevention, fighting and restoration.

The Code of American Standards for Fire Prevention and Fighting as established by The American Mining Congress through a committee of which Mr. W. V. DeCamp is chairman, may be divided into the following activities: *Prevention, Protection, Fighting, Restoration.*

The mines of this state (Arizona) have had enough experience with mine fires to recognize the value of fire prevention and fighting preparedness, so that I will not at this time go into this phase of the subject, but rather point out those features of prevention and preparedness which through experience have proven invaluable.

Fire prevention is, of course, of first importance and should receive detailed consideration, study and drastic application.

There is every reason why electrical wiring, and installation requirements, should be as rigid in a mine as they are by law in fireproof surface structures. Slipshod wiring has been the cause of many mine fires with the attendant loss in life and hundreds of thousands of dollars in damaged property.

There is every reason why workmen, whether they be timbermen, electricians

or mechanics, should clean up and thoroughly inspect their completed task. To permit rubbish to accumulate is to invite disaster. The use of torches and welding equipment underground should also be carefully checked. I am reminded of an alarm which was turned in six hours after electricians had left a level where they had been bonding rails. Careless handling of their electric welding equipment had set a timber covering over a pump sump to smoldering. They went their way little realizing the price of carelessness.

What would fire insurance adjusters say if they discovered gasoline, oils, and greases stored in various parts of the surface plant? Is it not far more important that these materials be stored in absolutely fireproof places underground? If such storage places are provided, is there an insistent demand that all oil cans be kept there?

Open lights, cigarettes, incendiarism, and spontaneous combustion are among the numerous other causes of mine fires. I believe the day is coming when the open flame carbide lamp will be discarded just as surely as the candle has been replaced, but science has not yet produced a substitute for the carbide lamp acceptable to the metal miner and the metal mining industry. Smoking falls in the same category. This practice has been successfully stopped in gaseous coal mines, but to what extent this could be accomplished in metal mines with the whole-hearted support of the miner is open to question.

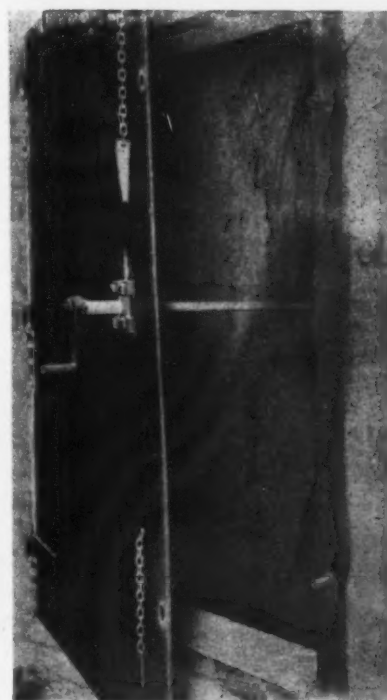
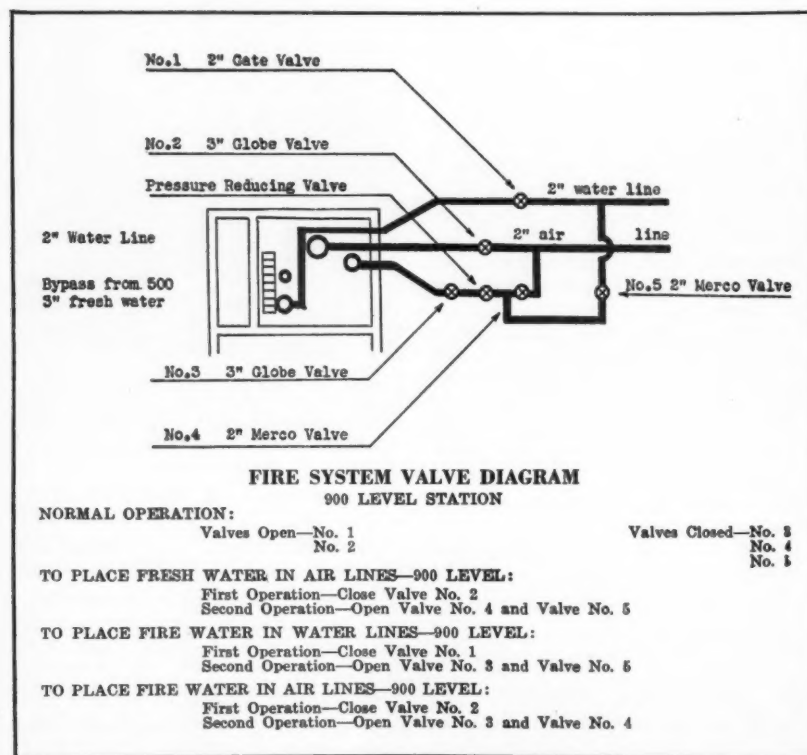
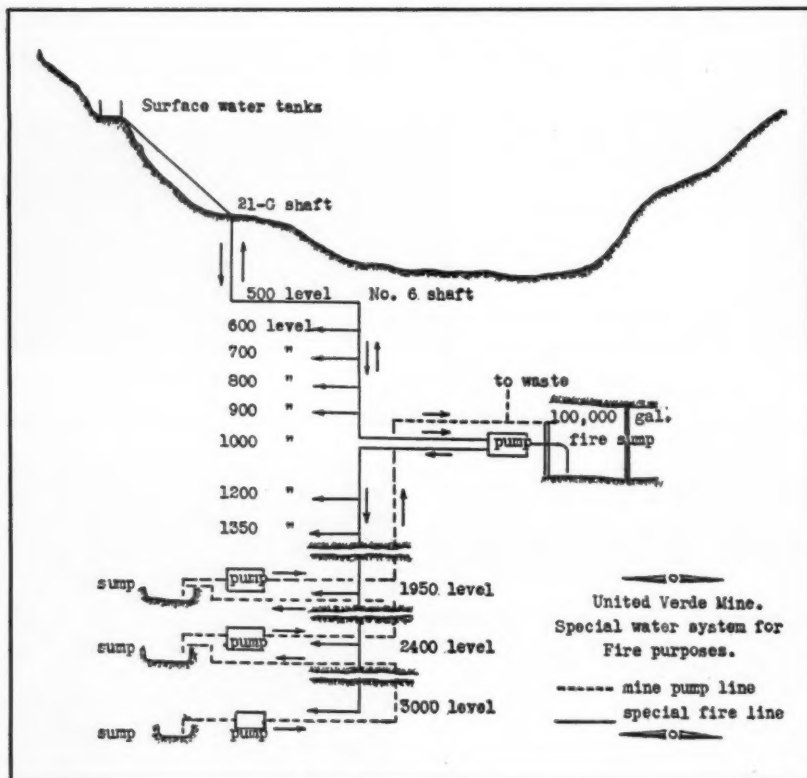


Figure 1. Fresh air shaft regulator. This door can be closed by means of feed screw and drawn practically tight by using wedge-shaped lugs shown in picture.

Incendiarism is a most vicious and murderous act and should be dealt with accordingly. There is no protection against it, but fortunately there is little of it, and as time goes on and the relations between employee and employer become more and more friendly there will be still less.

Spontaneous combustion is, as a rule, underestimated; oil-soaked timbers, the accumulation of rubbish, chips, paper, carbide, etc., is all too common, and should not be permitted. There are other causes of mine fires, but I believe that the most important causes have been enumerated. There is one more cause which has not been mentioned, but which I believe deserves attention, and

* Safety and Ventilation Engineer, United Verde Copper Company, Jerome, Ariz.
Presented at a meeting of the Arizona Chapter of the American Mining Congress, April 28 and 29, 1930, Bisbee, Ariz.



true cause ever coming to light. An explanation is not demanded usually because it seems such a little thing to make a big fuss about. You are all well aware that all fires start with insipient flames and that it is only when they go undetected that they do any amount of damage. I personally believe that mine managers ought to demand from some one in the organization a full statement in writing about every fire, insignificant as it may have been. "Cause unknown" should only be considered after every shred of evidence has been given due consideration without revealing some clue to the real cause.

PROTECTION

Under this caption I have classified fireproof construction of shafts, shaft stations, surface structures at mine entrances, Gunting and fire breaks, etc., as a means of preventing fire propagation. The proper location and construction of fire doors and their manipulation.

In all its ramifications, mine fire protection covers a big territory in mine operation and becomes an expensive activity when thoroughness is demanded. Thus it may be assumed that a shaft is not fireproof unless every bit of combustible material is removed. In other words, steel and concrete become the only permissible structural materials. This should apply to the shaft stations as well, for in such a program they must be considered as part of the shaft.

In heavily timbered mines, or in mines where extensive timbering must be resorted to if maximum extraction is desired, plans should be worked out and followed with a view to establishing horizontal or vertical fire breaks, or both, across the entire orebody. This may seem to be an unreasonable idea, yet it is unreasonable to assume that a fire might start on one of the lower levels, get beyond control, and gut the entire mine? City ordinances demand fireproof walls or fire breaks between buildings in crowded sections, such as business districts; why not have fire breaks in a mine, which, in horizontal extent, may embrace one or more city blocks? I realize that such a procedure is costly and may tie up much valuable ore. On the other hand, even small fires run into five and six figures in cost, and where would the profits come from if the mine were gutted?

Fire breaks in timbered drifts afford an excellent means of preventing or slowing up flame propagation. These breaks may be in the form of steel sets or gunited sections. Water spray rings of perforated pipe on posts and cap connected with the water system serve in a similar manner.

The proper location of fire doors is important. Their location depends upon the physical characteristics of the mine.

that is the *unknown cause*. I have worked in coal mines, and for several years in a particularly gaseous mine. It makes my blood boil every time I read of a coal mine explosion with its attendant loss in life, and then

as an explanation "*cause unknown*." In many instances the causes were plainly visible to those who would but see, long before an explosion occurred; and so with mine fires. Many insipient flames are extinguished without their

Generally speaking, they should be installed in drifts between timbered sections or timbered stopes in both the vertical and horizontal plane. They should be of concrete and steel construction, particularly where timber is within a hundred feet of them. They should be equipped with latches and may be hung so as to open in the direction of approach in case of fire, so that should a bulkhead become necessary or advisable, the iron door can be used as the inside part of the concrete form.

Timbered shafts and winzes should, by all means, be equipped with an adequate sprinkling system.

FIRE FIGHTING

When a mine fire alarm is given, immediate action is demanded in several directions.

(1) The underground workers must be brought to a point of safety without delay.

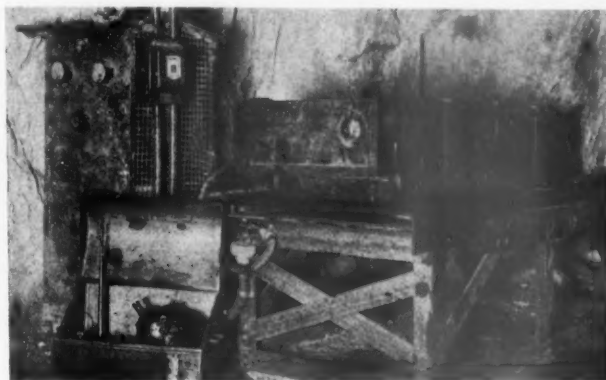
(2) The first report is usually meager in information, hence the location and extent of the fire must be investigated before any definite move can be made against it.

(3) The ventilation generally and locally must be controlled at once.

erty, depending on how good the system is, how thoroughly it is understood, and how well emergency problems have been worked out in advance." Life must be protected at all odds. If a ventilation system can not be adjusted to do this, it should be changed. I do not mean to infer that a system should be judged by smoke conditions within the working area, but I do mean that an exit should be provided which is dependably in fresh air under any and all conceivable conditions.

The ventilation system should be sufficiently flexible that any draft can be cut off from above, below, or any side. An ideal situation would exist if the air flow on the fresh air side of the fire could be cut off completely and the exact pressure exerted on the smoke side to hold the smoke within the flame area. If such a condition could be established the fire would not last very long. It may be argued that this is working on theory and that it is not practical. I know of one door in the United Verde mine which fulfilled that function so thoroughly that it is probably worth its weight in gold. That door was installed and practically unused for years. It is charred black now and streaked with

Figure 3 (below). Fireproof battery charging stand showing housed-in charging panel and fireproof container for oil cans.



(4) Fire-fighting crews must be organized and instructed.

(5) Water in sufficient volume, and pressure, must be supplied without interruption.

These five activities must progress simultaneously, yet must be sufficiently coordinated that one will not delay the function of the other. Time is the most important element in fighting mine fires.

A delay of 15 minutes may represent a loss of thousands of dollars. Preparedness becomes of paramount importance when fire threatens.

Ventilation control is vital. I have made this statement before, but believe that it bears repeating: "When a fire breaks out it is the ventilation system which will save or destroy life and prop-

erty, depending on how good the system is, how thoroughly it is understood, and how well emergency problems have been worked out in advance." Life must be protected at all odds. If a ventilation system can not be adjusted to do this, it should be changed. I do not mean to infer that a system should be judged by smoke conditions within the working area, but I do mean that an exit should be provided which is dependably in fresh air under any and all conceivable conditions.

Can the ventilation be so arranged that the fire fighters or helmet men are at all times only a short distance from a reliable fresh-air base? Nothing is so demoralizing as a 15 or 20 minute battle with heavy smoke before the fire is reached, with the knowledge that it will be an equal or greater distance back to safety. All of these conditions can be closely predetermined. The only unknown factor is the forced draft the fire will develop. This can ordinarily be counteracted if acted upon soon enough and the ventilation system permitting of the required rearrangement.

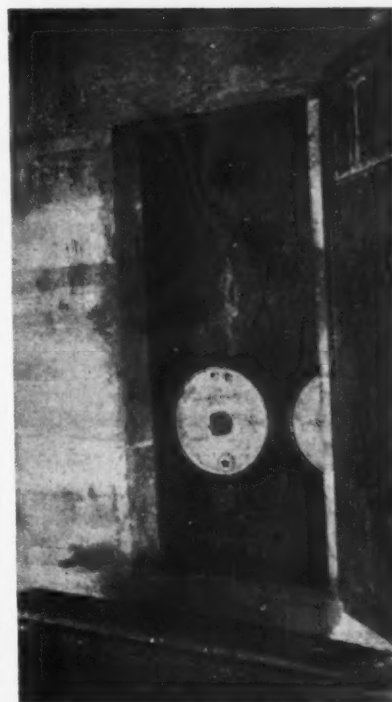


Figure 2. Fireproof oil storage



Figure 5 (above). A fireproof raise cover installed in horizontal fire break.

Before leaving the subject of ventilation, I want to dwell a moment on the reversible feature of mine fans. This subject has borne the brunt of many discussions and arguments. The coal mines are required by law, in most states, to operate reversible fans. In coal mines the demand has been voiced for reversible fans to expedite (under certain conditions) mine-rescue work. The only difference I can see between a metal-mine fire and a coal-mine explosion is that one possesses an instantaneous and destructive force wholly lacking in the other. A fan should not be reversed immediately after an alarm has been sounded. Men will, as a rule, make their way toward the known fresh air supply. To reverse the fan is to

draw destruction upon them. The air currents in a mine in time of disaster should absolutely not be changed until the location of every man in the mine is positively known. After this has been determined, and it is definitely known that better work can be done with the air currents reversed and that the reversal will not jeopardize the lives of men still in the mine, then, and only then, shall a fan be reversed. Each mine presents its own distinctive problem in the use of reversible fans, depending principally on the relations between the fresh-air shaft, return-air shaft, the hoisting and escape shafts, and the orebody. The reversible feature can be built into most old installations. The additional cost of this equipment on new fans is small. The added sense of protection derived from this feature is worth its cost. But another word of caution: know your air currents in reverse as you do under normal conditions. Mines with sealed fire areas should move particularly cautiously in this regard. Another point worth knowing is the direction of air flow with the fan at standstill. Is it always in the same direction, or does it vary with the seasons of the year? I have a case in mind where a natural draft of 50,000 cu. ft. per minute passes through the fan, in-cast in winter and outcast in summer. A sufficient volume to cause considerable embarrassment in case of trouble if this condition were not known.

The water supply ranks with ventilation in importance. Three things are necessary: An uninterrupted supply, a high and steady pressure at the nozzle, and a well-designed system of piping and valves. No matter what head may exist, it is beyond reason to expect a good pressure at several nozzle points if the water has to go through hundreds of feet of crooked 1-in. pipe.

The following figures give some idea of the pressures required at the beginning of 500 ft. of 1-in. and 2-in. pipe to obtain a given range of water stream with a maximum elevation of 8 ft. when discharged through 1 and 2½-in. nozzles:

POUNDS OF PRESSURE REQUIRED TO FORCE WATER THROUGH 500 FT. OF 1-IN. AND 2-IN. PIPE AND MAINTAIN THE INDICATED RANGE OF WATER STREAM

Through 500 ft. of 1-in. pipe	Range of water in feet with maximum elevation of 8 ft.						
	43 ft.	50 ft.	54 ft.	69 ft.	75 ft.	82 ft.	94 ft.
One ½-in. nozzle.....	84	127	169	212	254	296	338
Two ½-in. nozzles.....	336	509	676	850	1,020	1,185	1,350
Through 500 ft. of 2-in. pipe							
One ½-in. nozzle.....	22	33	44	55	66	77	88
Two ½-in. nozzles.....	88	132	176	220	264	308	352

A well-directed stream of water with a good pressure behind it will knock out a fire just as surely as a well-directed punch will floor a fighter.

The main water column in a deep mine

* U. S. Bureau of Mines Publications Bulletin No. 244. "Use of Stenches as a Warning in Mines," by S. H. Katz, V. C. Allison, W. L. Eby.

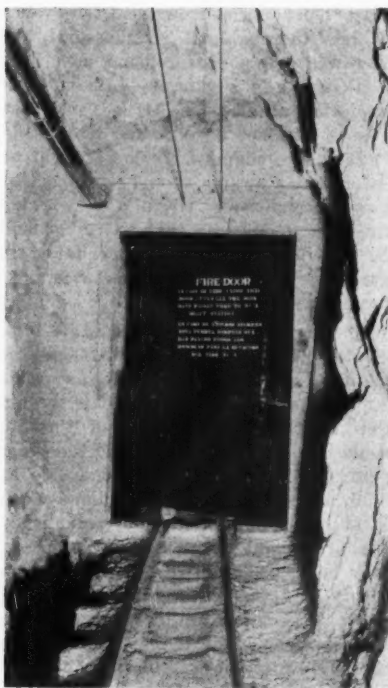


Figure 4. Fire control door. These doors are in the main haulage drifts between the shafts and the ore body. In case of fire they are closed, thus cutting off all fan pressure air from the ore body.

is, as a rule, equipped with various pressure-reducing devices which do not permit of an effective pressure in case of fire. If the column is otherwise adequate, bypasses around the pressure-reducing devices should be installed. Proper connections should be maintained at all level stations. The level laterals should be of sufficient size to give an adequate supply in the stopping zone.

The shut-off system of valves should be as thoroughly understood by a group of men as the air currents. All too often the pipe and valve installations are left to the judgment of the mine pipemen with the result that one frequently finds a maze of interconnected pipes and valves and no water when and where it is wanted. If for no other reason than quick service, methods such

that too much dependence will be put upon the use of the air line for water service, so that the water lines in themselves become wholly inadequate. Compressed-air lines, as such, are, as a rule, not equipped with valves at short intervals as most water lines are. This may allow the water to spread over a wide network of pipes, causing a loss in pressure and a corresponding drop in effectiveness. Furthermore, hose connections on air lines are usually at too infrequent intervals, or do not exist at all on the levels. Since the connection between air and water lines is usually an afterthought, little is done beyond the shaft to make it a real service line throughout the level. In both instances much valuable time is lost while rectifying existing conditions. On the other hand, it may be deemed advisable to have air at a fresh air or relief base. A compressed-air blower may have been set up to force smoke back. Many and varied conditions may arise which could be well met with compressed air if it were available. Again, trapped miners may be depending upon the compressed air to keep them alive. Another good reason for caution in this regard is the fact that air lines give many years of good service under nominal pressures, but are hopelessly wrecked when high-pressure water is turned into them. Such delays are so costly, particularly in mines where the fire risk is great, that make-shifts as these should not be considered. The water supply must be adequate; to this end it may be advisable to connect the water system with the mine pump column so that mine drainage water can be utilized if the demand arises. Where the water mains are in timbered shafts, it would be advisable to have an additional line enter the mine through another opening, or it might be found expedient to connect a bore hole with the surface-water supply system. Some auxiliary system should exist where the active water main passes through heavily timbered areas.

When a fire alarm is turned in, it must be broadcast in the most expeditious manner possible. Fire bells and sirens are of little use underground because they are heard by only a few, if any, men, depending upon their location. Signaling by flashing the electric mine lights depends for its efficacy upon the extensiveness of the lighting circuit. This method, too, does not reach every employe underground, although it is undoubtedly the quickest means of spreading the alarm. The stench method of warning, while slower than the lights, is, nevertheless, more efficient in that it reaches practically every working face in the mine. A number of liquids are recommended by the Bureau of Mines.* I am personally not in favor of the pungent odors for the reason that

as these, if they exist, should be remedied. Important valves throughout the mine should be labeled.

The practice of connecting the water column with the level air lines is not always to be recommended. If this becomes a general practice it is possible

men fighting fire are laboring under abnormal mental and physical strain; to add to this an unfamiliar odor which may keep one constantly on the verge of nausea may be more than some can stand. True, the stench is only used for a brief period, but nevertheless the odor sticks, as in the case of Butyl Mercaptan, and is very disagreeable.

The combination of electric light signal and warning by the introduction into the air lines of a liquid of characteristic odor, such as banana oil, is, in my opinion, a very effective and satisfactory mine fire alarm.

Emergency Organization

A definite plan of organization to function in any emergency should be worked out in advance. Such organization plan should be thoroughly understood by the management, and each member of such an organization should be instructed, preferably in writing, as to his duties.

Helmet men and supporting fresh-air men must be organized into three shifts. One shift, together with full equipment, must be sent underground with instructions and a leader. The fire foreman (man placed in charge of fire-fighting operations), ventilating engineer, and safety engineer must immediately acquaint themselves with the fire and underground conditions in general and without delay decide upon a course of action. Unless positively proven wrong, this course should not be changed because of rumor or unsupported unfavorable reports which somehow always become numerous and insistent.

The electricians and pipemen should be organized into shifts.

The engineering department should prepare for 24-hour service. It should supply maps and other required data. Transit men should be prepared to set lines for bore holes, etc.

The mine foreman and the superintendent can be of immeasurable value in organization and inspection work. Unharrassed by the many details confronting the fire foreman, they are able to get and maintain a better perspective of the whole situation and can therefore be of great assistance to the fire foreman, providing theirs is a cool head and a clear mind.

In large or deep mines it may happen that a fire does not stop production. In this case the operating force must be kept intact and the fire situation placed in the hands of a well-trained fire-fighting personnel. In mines where this is possible, care should be taken not to include too many operating bosses in the active helmet crew, as under such circumstances they would be required for their normal function, and would not be available as fire fighters.

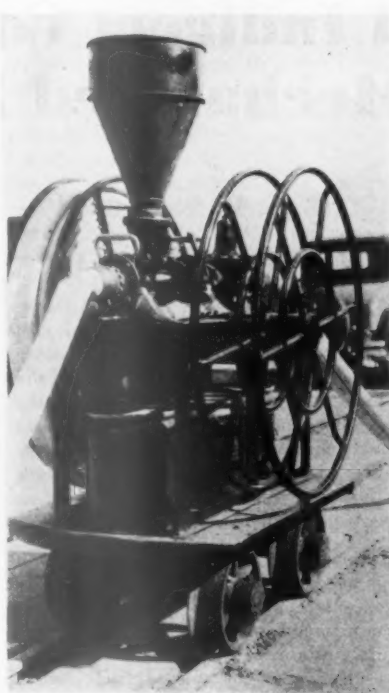


Figure 6. Foamite generator set up for action. The truck is designed to carry the generator, 200 feet of 2½-in. hose, and 160 pounds of Foamite powder.

Fire Fighting Equipment

This, again, is a protective measure which will vary greatly with different mines. Mines having a great fire hazard and deep timbered mines should be thoroughly equipped with fire-fighting devices and measures.

Bulkhead and brattice materials should be kept in very convenient and accessible locations, both underground and on the surface. Fire extinguishers have proven themselves of great value. A number of these should by all means be kept in convenient places and should be periodically inspected and refilled. A well-supplied tool truck is of great value. Such a truck should contain axes, saws, hammers, an assortment of nails, wrenches, pipe fittings of various kinds and sizes, pipe cutters and dies, brattice cloth, nozzles and an assortment of pipe nipples.

Mine rescue apparatus are an absolute necessity in fighting mine fires. They are worse than useless, however, if they are not kept in perfect condition at all times. Gas masks are of value only so long as their limitations are respected. Certainly no man should be sent into any fire area with a mask as his only protection if the air conditions are not positively known, and even then a coal miner's safety lamp should be carried to keep the wearer advised of the condition of the air he is breathing.

Mask and helmet men should, of

course, be trained men. It is advisable that Bureau of Mines standards be followed in this work.

Other valuable equipment consists of a high-pressure oxygen pump with two cylinders of oxygen mounted on a mine truck. A telephone mounted on a light truck, together with a reel containing at least a thousand feet of telephone wire. A high volume low pressure fan mounted on a mine truck to aid in forcing smoke and gases back. To be of value this equipment must be kept in perfect condition at all times.

Restoration

After it is assumed that a fire is out, the work of restoration should be attacked with extreme caution. At first fresh air should be admitted into the fire area in small volumes. Where travel through the fire area is possible, same should be very closely patrolled. Water lines and hose should be kept in readiness for any new outbreak. In confined areas, or filled areas containing timber mat, temperatures should be taken periodically. Any rise in temperature is a danger signal and should be carefully watched. When it is finally decided that the fire is out, rapid cooling of the affected area is desirable. This is best accomplished by concentrated ventilation.

Need for Mine Fire Code

In presenting this code of mine fire standards I have of necessity confined myself to the most important phases of this work. The code of the American Mining Congress, because of its requirements of universal application, is necessarily lengthy and in great detail. As it stands today it is a compilation of a vast wealth of information, born of experience in the heat of mine fires and brought together from all the mining sections of the United States.

A city skyscraper may represent an investment of twenty millions or more, its income may amount to a half million dollars per annum. It is built of steel and concrete throughout, even the furnishings are of metal. The state building code imposes many requirements upon the builder, designed, among other things, to protect the structure against possible fire. Miles of conduit carry the electric wires. The fire underwriters demand certain protection, such as a separate water system for fire purposes. In storerooms automatic sprinklers are required. With all this protection, it seems almost inconceivable that a fire can get started, and yet these buildings carry a heavy fire insurance.

Compare this condition with a mine valued at twenty millions of dollars. The hazard is so much greater that it is incomparable. The chance of escape for human (Continued on page 655)

Direct and Indirect Cost Savings With Mechanized Mining

By G. B. Southward

COAL mine mechanization has shown that there are two sources of cost savings under hand loading—the direct and the indirect. The direct savings are those made with mechanical loaders, scrapers, and other self-loading devices by eliminating the hand labor of shoveling the coal into mine cars, and also with conveyor and pit car loaders by reducing the amount of hand shoveling required. The indirect savings are those which are made in the other phases of mining such as the face preparatory work, the gathering, main line haulage, and the general items of underground operation and maintenance. In some cases the direct saving in the cost of the loading constitutes the major part of the economies effected in a mechanized operation. In other instances there is not a great deal of cost reduction in the actual loading operation itself, but the economies in the other phases of mining are those which justify the installation of the equipment.

The amount of savings effected in each of these classifications depends on a number of factors, such as the type of equipment, the mining system, characteristics of the seam, and the extent or percentage to which the entire output of the mine is loaded mechanically. In order to have a correct understanding of the possibilities which may result from a contemplated or an actual operation, it is necessary to take each of these factors into account.

If we first consider the indirect savings which are possible in the general mining operation, such as main haulage,

There are two opinions held by mining men. One is that the major part of the possible cost savings resulting from mechanized loading are in the actual loading operation itself—the other opinion is that the economies are the result of concentration, intensive supervision, and systematization.

drainage, ventilation and underground maintenance, it is very clear that the concentration of the mining area is a most important factor. It is now definitely established that a mining plan can be designed for mechanized loading which will decrease the territory very materially. Depending on the system used, the actual concentration as now effected varies anywhere from one-fourth to one-half of that required for hand loading. It is obvious that the cost of operating a small territory with few working places is less than that required for a larger area, but without taking a specific mine it is impossible to establish an average figure to represent the saving in dollars and cents or the reduction in the labor used.

The fact that the general mine operation does not depend on the manner in which the coal is loaded has led to the opinion being expressed that the economies made in this phase are the result of better management and that these economies could be had to the same degree with hand loading. This would unquestionably be true if hand loading could be concentrated in as few working places as mechanical loading, but so far this has not been done.

The statement is further made that with mechanized loading the cost savings effected at the working face are also due to intensive supervision of the preparatory and gathering operations, and that the hand loading mines by adopting the same procedures could produce coal at such a low cost that the expenditure necessary for loading equipment would not be justified. It is true that by changing present hand mining practices a higher efficiency can be had which will lower the present cost to some degree, but with these savings in effect it is still not possible for hand shoveling to put coal from the face to the main haulage with the same amount of labor or even approximately the same amount of labor that can be done with machines. The following example will illustrate this point. In this example no account is taken of items such as snubbing, shearing, slate handling, etc., which vary in different mines, but the comparison is confined to the regular operations of cutting, drilling, loading and gathering.

Under present practices in room and pillar mining in a 6-ft. seam with hand loading, a maximum of 15 tons per shift per loader is about all that can be expected where the men do their own drilling, shooting, timbering and track work. A panel would usually have about 12 working places, so that its daily production would be 150 tons. This would require two panels for a daily production of 300 tons. It is probable that one cutting machine would do the work on

TABLE SHOWING COMPARISON BETWEEN THE LABOR EMPLOYED IN HAND LOADING WITH MINER DRILLING AND SHOOTING

(b) Hand loading with drilling, shooting, and track work by the company, and (c) mechanical loading

	Hand loading with drilling and shooting by miner		Hand loading with drilling and shooting by company		Mechanical loading	
	No. of men	Percentage of total labor	No. of men	Percentage of total labor	No. of men	Percentage of total labor
Cutting	2	7%	2	8%	2	17%
Drilling .....	..	..	2	8%	2	17%
Shooting .....	..	..	1	4%	1	8%
Loading	24	80%	16	64%	3	25%
Gathering	4	13%	2	8%	2	17%
Track and timbering.....	..	..	2	8%	2	16%
Total men.....	30		25		12	
Tons per man-shift....	10		12		25	

both entries but that one gathering locomotive would be required for each panel. This would require a total of 30 men for the three operations of cutting, loading, and gathering to produce an average daily tonnage of 300 tons. This is at the rate of 10 tons per man employed.

If the usual custom is changed and the drilling and shooting is done by the company, then it has been found that the loading rate can be increased to almost 20 tons per man as a maximum. If the loaders are working two in a room it is possible to concentrate the working into one panel so that one cutting machine and one gathering locomotive would be sufficient. This would mean a total of 24 men for a daily production of 300 tons, which would be at the rate of 12 tons per man for all work from the face to the main haulage. It is very probable that this represents the maximum tonnage per man that could be expected with any form of hand loading in the room and pillar system.

If mechanical loading is introduced to replace the hand loaders in the panel just described there would be a crew of three men required for the loader with the cutting and other operations as in the preceding paragraph. This would mean a total of 12 men for a daily production of 300 tons for the preparatory work, the loading and the gathering which would be at the rate of 25 tons per man per shift.

A summary of three classes of operations are given in the table below. In the first column, which shows the usual hand loading practice, the work performed by the miner constitutes 80 percent of the total labor from the face to the main line locomotive. This immediately shows the great effect which can be had by the introduction of machines for this item. A partial mechanization of the miners' work is shown as having been effected in column 2, where the drilling is done mechanically. In this class of operation the labor performed by the miner has been reduced 16 percent from that in the preceding column, the number of men required has been reduced by 5, and the tonnage per man has been increased 20 percent. In the third column, showing complete mechanization, the loading requires only 25 percent of the labor for all operations, the number of men has been reduced to one-half of that with partial mechanization as in column 2, and the tonnage per man has been doubled.

The use of pit car loaders decreases the amount of labor in hand shoveling, and an operation of this kind would be somewhat as indicated in column 2 of the above table. It is possible for a man to load 30 tons per shift on a low type conveyor where the coal face is already shot down. If we substitute this

figure in column 2 the number of loaders would be reduced from 16 to 10 with a total crew of 19 men, to produce 300 tons for the shift. This would be at the rate of 16 tons per man employed from the face to the main line haulage.

With conveyor and scraper mining there is a very direct economy due to the increased tonnage per loader. This is not so great as in the case of mechanical loaders, but it has a very material effect on the total cost. However, with both of these types of equipment the indirect savings amounts to more than the direct reduction in the cost of hand shoveling.

With conveyor and scraper mining a higher degree of concentration is made than is usual with mechanical loaders or pit car loaders in the room and pillar system. This would indicate the possibility of the high degree of economy in the general mining operation and maintenance. With these types of equipment it is customary to take several cuts during a working shift so that the mining rate is very rapid. This results in indirect savings due to the fact that the roof support is much simplified. A further indirect economy is the elimination of the gathering haulage. Scrapers and conveyors in either the room and pillar system or in long wall mining form their own gathering unit and transport coal from the working face to a haulageway where a trip of mine cars can be placed by the main line locomotive. In low seams there is another saving which is the direct result of the type of equipment used. This is by eliminating rock brushing except in the haulage ways as conveyors and scrapers are worked in seams as low as 20 in. without taking either top or bottom at the working face.

MINE FIRE PREVENTION AND FIGHTING

(From page 653)

lives, as proven by past experience, is none too good. Where, then, is the mining law that demands a number of preventive measures, and where is the underwriters code which requires certain protective measures? And lastly, where is the insurance company that is willing to take the risk and assume the financial protection of a twenty million dollar investment underground?

Since none of these exist, I recommend that the mine operator write his own fire insurance in terms of a fire code and pay his own annual premiums through the strict observance and conscientious application of this code.

A SIMPLE CARBON MONOXIDE DETECTOR

An ampoule type of carbon monoxide detector has recently been tested by the Pittsburgh Experiment Station of the Bureau of Mines for sensitivity and re-

liability. This detector consists of an easily crushed cotton-covered ampoule filled with a solution which changes color when exposed to air containing carbon monoxide. In appearance the ampoule is similar to those filled with aromatic spirits of ammonia for giving inhalation treatment or those filled with iodine for use in first-aid treatment of wounds. In use the carbon monoxide ampoule is crushed, which wets the cotton covering with the solution. It is then exposed to the air to be tested. After a prescribed period of exposure the color is compared to a chart and the amount of carbon monoxide estimated.

This detector was devised primarily for examining the air of man-holes and sewers for possible dangerous contamination with carbon monoxide before workmen enter these places, but due to the simplicity of the device it may have a more general usage for examination of atmospheres which are known or suspected to be contaminated with carbon monoxide.

It was found that gasoline vapor, ethylene, hydrogen, and hydrogen sulphide produced a change in the color of the ampoules, similarly to carbon monoxide. The concentrations of these gases which produced the change were dangerous from the hazard of poisoning or of explosion.

The details of these tests are available from the Bureau of Mines.

DICHLORO - DIFLUORO - METHANE FOUND VALUABLE AS FLAME-QUENCHING MATERIAL IN MINES

Dichloro-difluoro-methane has been found practicable for the purpose of extinguishing methane flames, as the result of studies conducted at the Pittsburgh Experiment Station of the Bureau of Mines. The engineers and chemists at this station are investigating all materials which may be of value in rendering methane, which is the chief combustible gas liberated in mines, less inflammable. It had been found that added substances are of value if such additions narrow the limits of inflammability, raise the ignition temperature, lower the speed of propagation of flame, or reduce the maximum pressure developed. One of these substances, dichloro-difluoro-methane, which is less toxic than carbon dioxide, is a gas at ordinary room temperature and pressure. Tests have been made with this substance to determine the amounts which must be added to extinguish methane flames, and a comparison made with other substances when mixed with methane. The extinctive effect of dichloro-difluoro-methane is almost identical with that of carbon tetrachloride on a volumetric basis, and is superior to that of such gases as carbon dioxide, helium, nitrogen, and argon.

PRACTICAL OPERATING MEN'S DEPARTMENT



COAL

NEWELL G. ALFORD
Editor

Practical Operating Problems
of the Coal Mining Industry



COAL MINE STOPPINGS ---cost and upkeep



By Leslie Voltz *

IF IN any coal mine we have a fan installation perfectly suited to it, and the mine is ideally developed to secure good ventilation, we are still confronted by the problem of directing that air to the working places with the least air loss and a minimum cost, which brings to us the problem of the selection of the type of stopping which will best suit the purpose.

In this selection we must consider several things, which are (1) cost, (2) maintenance cost, (3) renewal cost, (4) cost of emergency repairs, and (5) cost of leakage. The selection as to cost, first, depends upon the length of time the stopping is to be in use, the air quantity and pressure to which it is to be subjected, and the cost in air leakage which the stopping loses every day it is in use.

In order to arrive at some accurate and definite figures on the question of the relative importance of material cost of stopping against the cost in air leakage, I have studied over U. S. Bureau of Mines Bulletin No. 99 on "Mine Ventilation Stoppings," by R. Y. Williams, and attempted to bring it up to date and bring out the outstanding comparisons it contains.

All of the costs are based on a stopping 4 ft. high by 10 ft. long and the

labor charges include cutting the hitchings and delivering material, except for the job stoppings. The cost of labor is based on \$4.50 for an eight-hour day. The cost of material is based on the following prices:

Rough board lumber, \$20 per M.
Finished lumber, \$40 per M.
Nails, \$3.90 per C.
Props, 9 cents each.
No. 2 common brick, \$13 per M.
Sand, \$1.50 per ton.
Cement, \$4 per bbl.
Concrete block (made at mine), 20 cents each.
Concrete block (shipped in), 28 cents each.

To make clear the costs and comparisons which shall be made the following explanation will make plain how the costs were arrived at. All the installation and maintenance charges, including first costs, maintenance, renewals and emergency repairs, have been reduced to a yearly basis, so as to show the amount of money that must be set aside each year to cover the upkeep and to provide for the return of the capital or the current rate of interest for a given number of years. As an explanation of this method of presenting the data and as an explanation of the terms used, let it be assumed that a number of main entry stoppings are to be built for a service of

15 years. The items for labor and material are included in "first cost"; the cost of labor and material required each year to make the stopping efficient or tight is included under "maintenance charges." In case the material used in building the stopping has an average life of only five years, the charge for additional stoppings that must be built to give the 15-year service comes under the head of "renewal repairs." If the stoppings are of such type as has been found in practice to be subject to destruction by shot firing, explosions, fires, water, etc., "emergency repairs" will be required. If air leaks through the stopping and increases the volume of ventilation required of the fan, the amount of horsepower necessary to furnish the wasted air will determine the cost of stopping inefficiency, or the "costs of air leaks through stoppings."

The last of these is the one which I wish to stress particularly, and show how unimportant the first four costs are when they are examined against the "cost of air leakage through stoppings." For example, I have estimated that a 4 ft. x 10 ft. rough board stopping, hitched into roof, rib and bottom, will have a first cost of about \$3.63 against \$15.20 for a concrete block stopping of the same size. However, if both of these stoppings are subjected to the same conditions of air pressure and velocity, the board stopping will show an average leakage of 340 c. f. m. against 6 c. f. m. for the concrete block stopping. Reduced to a cost in dollars, the board stopping will cost \$208 per year for air losses, while the concrete blocks will show a cost of only \$2.30 for the same item.

I realize that it is highly improbable that a rough board stopping would be used where air pressure is great or in a place where velocities are high enough to give so great a loss, but it is the large costs of air leaks which I wish to bring out. Now, to carry the comparison further, suppose we have a stopping which is to be in use for a 15-year period, and our choice lies between a rough board stopping and a solid concrete stopping. The first cost of the board stopping will

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be less than one-third that of the concrete stopping, but our yearly cost over a 15-year period will be more than twice that of the concrete type, due to the high maintenance, renewal and emergency repair cost of the board stopping. It can thus be seen that, due to the short life of wood stopping, which is from three to five years, and their high annual cost in air leakage, we must look elsewhere for a satisfactory type of stopping for use over periods of more than five years.

As long life stopping we may consider brick, concrete, concrete block, and gob or slate stoppings. Each of these stoppings have several advantages over those of wood, the most important being their much longer life, which is necessary in any place where air course and hauling must be maintained over a period of years or for the life of the mine. The brick stoppings are considered as single 4-in. brick walls and as 8-in. double-brick walls; the concrete stoppings costs are based on an 8-in. solid wall. The concrete block stoppings are built up of 8 in. x 8 in. x 16 in. blocks, and the gob stoppings are divided into dry gob walls and gob walls with a 1-in. concrete face.

The first cost of a dry wall gob stopping, where plenty of material is available, is \$4.50, or more than one-third that of a concrete stopping, which costs \$12.50, yet the cost in air leakage per year for a gob stopping is \$96 against \$2.30 for the concrete stopping, or approximately 40 times as much. If the gob stopping is faced with concrete, its cost will run to about \$8 and its cost in air leakage will be cut down to \$22 per year. From the standpoint of annual cost for a 15-year period the concrete faced gob stopping will cost \$1.86 per year against 85 cents for the concrete stopping.

Besides these disadvantages the gob stopping is neither fire or water proof. It usually contains large quantities of dust, which will help to propagate an explosion, and if it is blown out by an explosion it leaves large quantities of gob to be cleaned up. All in all, it is a very unsatisfactory type of stopping.

The next type of stopping to be considered is the solid concrete stoppings, hitched well into roof, ribs and bottom. The first cost of this stopping will be \$12.38 and is a very efficient type for use as a permanent stopping. It has about the same advantages as the brick and concrete block in that it gives protection against fire and water. It has low air losses and the maintenance costs are low. One advantage it has over either of the other types is its high bearing strength, which supports the roof and resists cracking under pressure. Its greatest disadvantage is the handling of large quantities of rock, sand and cement, which usually must be mixed by hand, and getting a sufficient supply of water

which is fit for use in mixing concrete. In case where the water supply is a problem, the concrete block or brick stopping may be used to advantage as much less water is needed.

The 4-in. brick stopping will cost around \$11.45, or just about \$1 less than the concrete stopping. This cost may be somewhat lower if the mine is located near a brickyard, and in that case this may be a desirable type to use. It has disadvantages in that its yearly cost over the 15-year period is nearly twice that of concrete, and its annual cost for air leakage is \$4 per year against \$2.30 for the concrete. A 4-in. wall is also rather easily shook down and has very little bearing strength. The 8-in. brick wall will cost about \$21.20 and has the advantage of greater durability, higher bearing strength and a one-third lower cost for air leakage over the 4-in. wall. Its higher first cost over that of the concrete blocks and concrete stopping puts it out of the running for most mine use unless unusual conditions prevail.

The concrete block stoppings have several advantages. The blocks are in large units, easily handled in the mines, and it requires a minimum of concrete to be laid up. Where the blocks are made at the mine, the cost will not run over 20 cents per block and will possibly run under this. The air leakage is as low as that of concrete or brick stopping, and it gives protection against fire and water. In annual cost over a 15-year period costs on 95 cents against 85 cents for a concrete stopping, while its annual cost in air leakage is \$2.30, the same as that of the concrete type.

The wood stoppings I wish to consider are as follows: (1) Wood, rough lumber; (2) wood, tongue and groove; (3) berkytt lath plastered with wood fiber; and (4) board dressed on both sides and painted. The most efficient type of these stoppings is the one made of berkytt lath plastered with wood fiber. The first cost is \$6.90, or a little less than twice that of a rough board stopping. If it is well constructed with $\frac{1}{2}$ in. of wood fiber plastering on the intake side and chinked up well at roof and ribs, it makes the most efficient type of wood stopping. The annual cost of air leakage for this stopping is only \$15 per year against \$208 for a rough board stopping, and it will average a two-year longer life.

The other two types of wood stoppings—(1) the tongue and groove and (2) wood stopping dressed on both sides and painted—have the advantage of lower air losses than the rough board stopping. The air loss through a tongue and groove stopping is only one-fourth that of a rough board stopping, while its first cost is a little over one-third more. The painted board type has a longer life than any of the other wood types of

stoppings, and its air leakage costs are lower than any type except the plastered berkytt lath stopping.

I hope that this short discussion has driven home the point of great importance in the consideration of stoppings; that is, that first cost is only a very small sum compared with the cost of air leakage.

I believe that every mine operator can save a considerable sum each year through careful selection of the proper type of stoppings to give efficient ventilation of his property.

IGNITION OF COAL DUST BY ELECTRIC ARCS

A number of mine explosions have been started by the direct ignition of coal dust by an electric arc in pure intake air. This process has also been demonstrated many times in the pit mouth of the experimental mine of the Bureau of Mines near Bruceton, Pa. About 25 pounds of fine Pittsburgh coal dust is blown from a shelf by compressed air and falls across an arc lamp where it is ignited. Flame spreads through the cloud and flares out the portal in a spectacular manner. The arc lamp is the old-fashioned kind formerly used in street lighting and has the protecting glasses removed. The current is about 6 amperes and the voltage across the carbon electrodes about 80 volts.

Tests have been made recently in which the device was erected at the face of the main entry and the minimum quantity of coal dust required to give good ignition determined. It was found that 5 pounds of dust ignited in one of three trials. Failure in the other two was probably due to lack of contact between the small dust cloud and the arc. When 10 pounds of coal dust was used ignition was obtained regularly. Flame spread through the cloud and extended 25 feet or more from the arc.

As a further test, dust was placed on the shelves and floor of the mine in the regular manner over a zone extending 100 feet from the arc and 10 pounds was blown from the shelf onto the arc. The dust ignited, a general cloud was produced and flame extended 50 feet beyond the end of the dust loading accompanied by a pressure of over 7 pounds per square inch. There can be no question that the explosion was self-sustaining and would have continued indefinitely had dust been present. Further tests are planned in which the arc will be drawn between a trolley wheel and wire.

This emphasizes the need of thorough rock-dusting at points where electric arcs may come in contact with coal-dust clouds. If further evidence is necessary it need only be said that electric arcs are now the second most important source of ignition of coal dust in mines.

Preventing Accidents from Falls of Roof or Coal



By N. L. Muir*

ACCIDENTS from falls of roof and coal do not attract the attention that mine explosions do, because usually they do not cause the death of a number of persons at one time. Many persons are surprised when told that approximately 50 percent of mine fatalities are caused by falls of roof and coal, yet this is a fact. In Pennsylvania during the five-year period, 1923 to 1927, 587 persons were killed and 517 were permanently disabled from this cause alone; moreover, during this period falls of roof and coal caused 9,949 temporary compensable injuries up to January 1, 1928 (compensation did not begin until after 10 days of disability, hence it is entirely possible that at least as many more were injured but were not disabled long enough to receive compensation), which is equivalent to 39.6 percent of all temporary disabilities. The ratio of falls of roof and coal accidents to all other bituminous coal mine accidents for Pennsylvania is approximately the average for the United States, and therefore these figures forcefully direct the attention to the importance of taking energetic measures to reduce materially this cause of mine accidents.

The American miner is often reckless and he does not pay attention to warnings; he often believes that carefulness may be mistaken for cowardice. This attitude is probably responsible for many roof-fall accidents. Frequently when miners are instructed to make a working place safe, they argue that they have had 20, 30, or 40 years' experience and know how to take care of themselves. Length of service is not a guarantee against accidents; in many cases it appears that years of association with danger have developed a sense of contempt for danger. Often those minimizing danger hold certificates of competency in mining but a certificate will not support a loose or dangerous piece of

roof and remember one post will support more roof than years of experience.

There is a certain class of men who resent words of warning, as if this is an insult to them; their tendency to argue and their stubbornness in resisting direction frequently lead to serious or fatal accidents. In this class may be placed the man who is slow to act, the man who refuses to place a prop until a car is loaded, the man who refuses to set another prop, as there is only a car of coal to be loaded as in a pillar working. Men of this type are very likely to be killed or seriously injured and only too frequently these men are the victims of roof falls. A false feeling of pride, a fear of being called cowardly may so work on the mind that caution is mistaken for fear. Recklessness is usually shown by this group of old-time mine workers and accidents are a natural result, for loose roof is not impressed by recklessness, on the contrary, at times it seems to derive a grim pleasure from such fool-hardiness. If you are one of this type you owe it to yourself, to your family, and to your fellow workman to "snap out of it." Safety is a personal responsibility and it should not be taken as a task added by the company.

If all employees were allowed to work in their own way, accidents would be more frequent than is now the case. Fortunately the legislators of the various states have realized the necessity for requiring safe operation of mines and to a greater or less degree have enacted laws establishing responsibility for protection against falls of roof and coal as well as other causes or accidents in coal mines. The state having the best law does not necessarily have the lowest accident rate. The degree of enforcement of the requirements of the law or absence of specific law or regulations is an index of the accident rate for any given state or district of the state. However, in most cases sound common sense on the part of those engaged in the operation of mines demands that pre-

cautions of a much stricter nature than the law demands should be taken, if the mine workers are to be protected from accidents of all kinds in mines. The accident rate generally is higher in states and districts where there is no organized program involving systematic methods of timbering, inspection, and close supervision. Supervision should be practiced by everyone; the workman should carefully inspect his working place, he should be sure that all dangerous roof or coal is taken down or well posted and whenever any other person enters the working place, he should be required to observe all safety rules by the man working in that place.

The majority of state laws on timbering have the following general features:

- (1) The owner or operator upon request of the mine officials shall furnish the necessary timber, props and caps and keep them always available for the use of workmen;
- (2) the mine superintendent shall furnish at or near the mine openings the necessary timber and keep it readily accessible for the use of the workmen;
- (3) the mine foreman shall have timber, props, etc., delivered near the place where they are to be used, generally at the place where empty mine cars are delivered;
- (4) the mine foreman or assistant or assistants shall visit each working place at regular intervals to see that the laws and rules are being observed, and he shall not permit any person to work in a dangerous place except for the purpose of making it safe;
- (5) miners shall examine the roof in working places before beginning work and shall pull down any loose or dangerous roof material or make it safe by using timber or otherwise, and where the necessary timber is not available miners shall leave the place.

Local conditions in mines such as the thickness of the coal bed being mined, the lay of the bed, and the method of mining control the natural hazards which result in accidents from falls of roof and sides. Some states have recognized the difficulty of enacting specific regulations for the many local conditions and have authorized or required the adoption by the owner or operator of special rules which shall not conflict with the law in any way. A privilege of this character has great value in supplementing the law and in promoting safety, particularly in the matter of detailed regulations for systematic timbering, inspection and supervision. The state laws recognize that the miner must be careful and work in only safe places, therefore he is as responsible for the condition of his working place as the mine officials.

To be effective, company rules should be prepared in pamphlet form and issued to each employee. These rules should state definitely the duties of every mine

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employee from the mine foreman to miner. The responsibility for the support of roof and coal should be placed on the miner and the mine official alike; and there should never be any doubt as to where the responsibility lies.

REGULATIONS FOR PREVENTING ROOF-FALL ACCIDENTS

Coal mining companies that have been most successful in reducing accidents from falls of roof have adopted in substance most of the following rules, according to Bureau of Mines Information 6053:

(1) It shall be the duty of all company officials to exercise continuous, unremitting efforts to prevent the occurrence of accidents from falls of roof.

(2) The strict observance and enforcement of all rules, regulations, and laws for safety shall be a condition of employment for all underground officials.

(3) Disregard of rules, regulations, and laws with respect to roof support shall be cause of dismissal of any employee.

(4) The official or foreman in charge of any section of a mine shall be held personally accountable for workmen in his charge who disregard the regulations as to care of roof and timbering.

(5) A foreman or face boss shall not be placed in charge of a greater number of working places or men than he can visit with sufficient frequency during a shift to insure observance of the regulations.

(6) Strict adherence to a definite system of timbering, adopted by the management as suitable to roof conditions in the particular mine, shall be compulsory. Additional timbers, necessitated by special conditions, shall be placed immediately as determined by the foreman.

(7) Upon finding any portion of the roof in need of immediate attention, the foreman shall remain and see that any dangerous material is either taken down or properly supported with timbering; or he shall order the workman to vacate the place at once and shall display a sign of danger at the approach to the place until such time as the roof is made safe.

(8) The miners shall be provided with suitable tools for setting timber. The company shall supply an adequate amount of suitable timber reasonably close to the point where the timber must be used.

(9) Each accident due to a fall of roof shall be thoroughly investigated by a committee of underground officials, in which the official in charge of the district where the accident occurred is not included. He shall be permitted, however, to submit a statement to the committee. The committee shall prepare a written report discussing the cause of the accident and including detailed

sketches of the scene as well as recommendations for means of preventing recurrence. A copy of this report shall be placed upon the mine bulletin board for the information and benefit of all underground workmen.

It will be seen that the miner and mine official have certain definite duties.

INSPECTION

The degree of success of regulations depends largely upon their rigid enforcement; and this, in turn, depends upon an adequate and efficient system of inspection. The mine manager or superintendent can not be expected to be familiar, personally, with daily safety conditions in the mine; he has other major duties which properly occupy a large part of his time and thought. The foremen, of course, are more closely in touch with underground safety features, including roof conditions; nevertheless it is highly desirable to have an independent point of view. Hence, if the mine manager is to be kept properly informed and if the desirable check is to be obtained at mines of any considerable size, the entire time of at least one man should be devoted to inspection of safety conditions and practices. Even at smaller properties where the extent of the mine is not sufficient to justify such a course, an assistant foreman or face boss should be detailed for this duty and the safety engineer or some other official should check and report upon conditions found by personal examination of the working faces at least once each week. It is also an important condition of efficient inspection that observation as to safety conditions be entered in a notebook by the person making the inspection while underground; and these notes should be transferred promptly to a permanent record book (or record sheets) kept in the mine office for study and future reference.

One large capacity coal company in Pennsylvania adopted a system whereby each mine official carried a notebook with sheets appropriately ruled to record location of every place visited, the check number of the workman or workmen, the time of visit and the condition of the working place. The novel feature of the system is a code, whereby a letter or number represents a condition, such as, W indicates water in the place, NP no post, and similar abbreviations. It requires little time to make an entry and the written record of conditions found is valuable. A summary sheet is posted every night, showing the names of those men disobeying a safety rule. The introduction of this system is reported to have greatly reduced the number of accidents, especially from falls of roof and coal.

Every person underground should be working for safety and should help the

safety engineer. This may be done, not only by keeping your own place in a safe condition, but also by reporting unsafe conditions and careless workmen to your boss or the safety inspector.

Support of roof is governed largely by the method of mining, by artificial supports, such as timbering, and by systematic inspections. The method of mining is usually determined by considering the factors that give promise of the greatest economy in the cost of production and is not always based upon factors that give promise of maximum safety to the workman. Where the latter has been disregarded in planning the mine, there is need for adopting regulations that will provide for the safety of the workman, and this involves artificial support of the roof which calls for rigid inspection and a system of timbering that must be strictly carried out. The careful miner will take care to follow instructions and in so doing will aid in securing increased safety in his mine.

Supervision is absolutely necessary to obtain enforcement of regulations and responsibility for supervision rests directly on the mine foreman. Supervision is made easier by observing certain practices. The first step is to make certain that every new employee is competent to do the work assigned him. This may be accomplished by questioning and by having a section boss instruct each new employee in the methods used and warn him of dangers existing in the mine, and then give the employee constant supervision until satisfied that he is a safe workman. It might be advisable to place new men with experienced workmen before assigning them a place. The second step in securing effective supervision is to select the mine officials with great care. The third step is to assign an official to a territory that may be covered in at least two hours; this usually places a limit of about 25 men to a section boss. Finally, supervision can only be made effective by strictly enforcing all rules. When a system of timbering is adopted it should be strictly enforced, otherwise the officials will have to spend so much time in individual working places having them placed in a safe condition, that they can not properly supervise the other men in their sections. By making a written record of conditions in each place, the element of guess or failure to remember certain irregularities in the support of roof is removed and the greater efficiency in supervision is reflected in the greater enforcement of regulations.

Finally, if the miner is to be protected from falls of roof, he must know the condition of the roof at all times. The best known method of determining the roof condition is to make frequent tests by "sounding" it.

NEWS OF THE MINING FIELD



Fire at Homestake Destroys Ellison Hoist and Buildings

Fire at the property of the Homestake Gold Mining Company, at Lead, S. Dak., on July 10, destroyed the Ellison hoist and two other buildings, caused the death of two miners and injury to several others. Damage has been estimated at between \$500,000 and \$750,000. A temporary reduction of 25 percent in production resulted until other shafts were able to handle the ore. Reconstruction now under way is expected to be completed inside of three months.

The miners were killed when the cage in which they were riding dropped from the 1,500-ft. level and was crushed by the weight of the 2,300-ft. steel cable which fell upon it.

The engineer in charge of the hoist was lowering the cage when the fire broke out. Realizing that he could not have time to hoist the men to safety, he stopped the cage at what is believed to be the 1,500-ft. level. The miners, however, unaware of the fire, stayed in the cage and soon the huge cable tore loose and dropped on the cage, hurtling it downward to the bottom of the shaft.

The fire started early in the evening from an overheated exhaust pipe on a compressor. Spreading quickly, the blaze caught the hoist and burned into a change room adjacent. Prompt work in reversing the draft and precautions taken below surface prevented the fire from eating into the shaft itself.

North Lily Stockholders Approve Knight Investment Company Acquisition

Stockholders of the North Lily Mining Company on July 25 approved of the plan to purchase a controlling interest in the holdings of the Knight Investment Company in the Tintic District of Utah, aggregating 4,000 acres. The new deal is similar to that approved by stockholders nearly a year ago. Under the old deal financing was to be done by a syndicate that was to purchase a block of North Lily-Knight Company stock from the Knight Investment Company. A syndicate was organized, but before the deal was completed the stock market collapse occurred, and financing plans were not completed.

Under the plan just approved the North Lily Mining Company in ex-

change for control of the North Lily-Knight Company or a block of 1,150,000 shares, will appropriate from its treasury \$300,000 for the development of North Lily-Knight holdings. The sum of \$125,000 is to be loaned to the Knight Investment Company. This loan will be secured by 400,000 shares of North Lily-Knight stock on which the North Lily Company will hold an option to purchase at \$1 a share. The loan will be further secured by a promissory note from the Knight Investment Company as additional guarantee assuring the repayment of the loan and to make certain the availability of an additional \$125,000 for development purposes.

Completion of the deal will result in immediate resumption of shaft-sinking operations at the Big Hill property. The North Lily-Knight will control, besides the Big Hill, the Twentieth Century, the Empire Mines Company, one-half interest in the Tintic Central Mining Company, Dragon Consolidated Mining Company, Defender Mining & Milling Company, Eureka Swansea, Middle Swansea Mining Company, Eureka Hill Railroad, North Godiva Mining Company, Swansea Consolidated Mining Company, Southern Eureka Mining Company, and some unpatented.

Federal Mining & Smelting Increasing Capacity of Page Mill

The Federal Mining and Smelting Company is increasing the capacity of its 300-ton mill at the Page mine, near Kellogg, to 500 tons daily. Additional crusher equipment is being installed and is expected to be ready for operation August 1.

A crusher and ball mill formerly used in the Federal Company's Morning mill, near Mullan, have been overhauled and are being installed.

Ore was formerly crushed by a jaw crusher and run from there direct to the ball mill, but with the new system the ore will be run from the jaw crusher to a gyratory crusher, through rolls from there, and then to the ball mill. This more detailed process is expected to result in a much better ore recovery.

The 300-ton mill has been running at capacity on a three-shift basis, and underground operations are continuing steadily with stoping down to the 1,200-ft. level.

A. S. & R. To Drill Holdings in Park City District

A contract has been let by the American Smelting & Refining Company to churn drill its holdings in the Park City mining region, Utah, it was announced by A. H. Means, manager of the mining department of the company.

Holdings of the company in the Park City district consist of approximately 1,000 acres, located in the north zone to the north of the Silver King Coalition. Included in the group is the old Grisselle Chemical property, which was operated some years ago.

A considerable portion of the property is underlain with the Park City formation, and these formations will be tested with the drill before further development work is done. It is probable that several holes will be sunk by the drillers, Mr. Means stated.

The American Smelting & Refining Company acquired the property nearly a year ago.

State Geologists to Meet in Montana

The Association of American State Geologists, composed of chief geologists or heads of geology bureaus in 41 states, will hold its annual field conference in Montana, August 24 to 29. President Francis A. Thomson, of the Montana School of Mines, who is director of the state bureau of mines and geology, will be host to the association, and has planned a program that includes a six-day tour of the Montana Rockies, with visits to both Glacier and Yellowstone Parks, and a business meeting and banquet in Butte.

A. S. & R. Acquires Interest in Mining Trust, Ltd.

William Loeb, vice president of the American Smelting and Refining Company, announced that the company has acquired a substantial interest in Mining Trust, Ltd., which owns the majority shares of Mount Isa Mines, Ltd., one of the greatest lead-zinc-silver mines of the world, located in Australia. Mining Trust also owns Lawnhills Concession in northern Queensland and controls New Guinea Gold Fields, Ltd., Compagnie Nouvelle des Mines de Ville-Magne and Mining Trust of Northern Rhodesia.



A. W. Dickinson

ON July 1, The American Mining Congress announced the appointment of Mr. A. W. Dickinson as Chief of its Tax Division. At the same time it announced the resignation of McKinley W. Krieh, who has served as head of that division for the past several years. Mr. Krieh enters private practice.

Mr. Dickinson brings to the organization a wide and varied experience that will be extremely helpful in the work he is undertaking. He is a graduate of the Michigan College of Mines with E.M. degree. His early experience was in the Michigan copper fields and in the lead and zinc fields of Wisconsin. This was followed by several years in the coal fields of Illinois, Kansas, Missouri and Arkansas. He served as mining engineer for the United States Coal Commission, and also for a time was valuation engineer in the Income Tax Unit of the Department of Internal Revenue. For the past six years he has been General Superintendent of Mines for the Union Pacific Coal Company of Wyoming, and while there gave special attention to the application of the machine to coal production.

Mr. Dickinson is eminently qualified to serve the mining industry as a member of the staff of The American Mining Congress.

E. V. Daveler Named Assistant General Manager of Utah Copper

Erle V. Daveler, treasurer of the Utah Copper Company, and the Bingham and Garfield Railroad, and vice president and treasurer of the Nevada Consolidated Copper Company, has been promoted to the position of assistant general manager of the Utah Copper, filling the vacancy created by the promotion of D. D. Moffat to the office of vice president and general manager, succeeding L. S. Cates.

Mr. Daveler started with the Jackling interests 20 years ago, and has held the following offices: Classification foreman and testing engineer, Magna mill, Utah Copper; general foreman and general superintendent, Ray Consolidated Copper; superintendent of the Alaska Gastanau; general superintendent and general manager of the Butte and Superior. On May 1 he was made treasurer of the Utah Copper. Mr. Daveler will make his headquarters in New York.

Two other Utah Copper men were promoted: J. D. Shilling, as mine superintendent, advances to a newly created office of assistant to General Manager Moffat; Louis Buchman, assistant mine superintendent, has been promoted to mines superintendent.

Old Dominion Making Improvements

Improvements, additions, and new construction amounting to an expenditure in the neighborhood of \$100,000 are being started by Old Dominion Company, at Globe, Ariz. This work will be centered almost entirely at the main shaft.

It is understood that contracts have been awarded to furnish steel for the construction of the 120-ft. headframe and the 1,500-ton hopper bottom storage bin, upon which work is already under way. This installation is for the purpose of increasing storage capacity between the mine and the crushing plant. The work of erecting the new headframe, which is being constructed over the present timber frame, is expected to be completed by September 1.

Following construction of the headframe, work is to be commenced on cementing the 2,600-ft. shaft from top to bottom.

North Butte Company to Issue More Stock

Stockholders of the North Butte Mining Company, meeting at the company's headquarters at St. Paul, Minn., July 8, authorized issuance of 500,000 additional shares of common stock at a par value of \$2.50 a share. The board of directors then voted to offer the new stock at par to stockholders of record July 7, the offer to expire August 1.

North Butte mining stock is quoted on the Boston exchange at around \$1.75. The action of the stockholders, it was said, was in anticipation of favorable developments soon in the company's east side properties at Butte.

Paul A. Gow, president, said that owing to low copper prices the company's Granite Mountain mine is being operated just sufficiently to meet expenses and keep it in first-class condition. Exploratory work is proceeding in the east side property.

Arizona's Mines Appraised at \$278,306,761 by Tax Commission

In a tabulation released by the state tax commission, Arizona's producing mines and mining properties are valued for taxation purposes this year at \$278,306,761. This is a reduction of \$2,856,739 in comparison with 1929. The value of producing patented and unpatented mines declined \$11,053,828. The value this year tentatively is set at \$217,098,533.

The tabulation shows, however, that while the value of producing mines is reduced, there is an increase of \$6,198,089 in the value of other properties belonging to the mines, this classification totaling \$61,208,226 for 1930, as against \$55,010,139 for 1929.

Phelps Dodge Safety Contest Shows Only Nine Accidents in June

With a perfect record of no lost-time accidents for the month, the Morenci Branch of the Phelps Dodge Corporation won first place in the June safety contest of the corporation, according to a report of the Copper Queen Branch Labor Department. The Old Dominion Branch, at Globe, Ariz., which has won every monthly contest but two thus far this year, dropped to fourth place, with two lost-time accidents for the month. The Copper Queen Branch, also with two lost-time accidents but employing more men than Old Dominion, was in second place; the Moctezuma Copper Company, of Nacozari, Mexico, with four accidents, was in third place; and the Stag Canon

Branch, of Dawson, N. Mex., last, with two. Only nine accidents were chalked up in the five branches for the month of June.

Total accidents in all five branches for the year to date is only 55, with the Old Dominion Company leading the group with only three since January 1. The Morenci Branch has had 10 lost-time accidents, Copper Queen 20, Moctezuma 14, and Stag Canon 8.

New York Mining Exchange to Begin Active Trading Soon

Announcement has been made that active floor trading of the New York Mining Exchange will commence September 10, and permanent executive offices have been established in the Munson Building, 67 Wall Street, New York City.

The exchange was organized in January of this year under a charter of the State of New York for the purpose of providing a central market for securities of established companies engaged in mining, oil and allied industries, especially many of those stocks now listed and traded on the various exchanges of the United States, Canada and other countries.

The first call on the trading floor will be of a selected list of seasoned mining and oil issues. As the volume of trading increases, a classification will be made and issues will be segregated into those classed as mining investments, those classed as meritorious prospects, and unlisted. It is also purposed to permit original financings under proper regulation.

In addition to providing a central open market in the eastern financial center of the country, it is also the purpose of the New York Mining Exchange to protect the public from fraudulent flotations in so far as rigid preliminary investigation and surveillance of trading floor operations make it possible to do so, and by maintaining a high standard to establish public confidence with respect to dealings in such securities. Reliable information and statistical data concerning all investments or speculative issues listed on the exchange will be collected and distributed among its members and associate members.

The management of the exchange is in a board of governors, with Heber C. Hicks as president and chairman of the Board of Governors. The board will be supplemented by technicians, statisticians and affiliated competent engineers and geologists strategically located throughout the United States and Canada.

The Mining Exchange is now giving consideration to and investigating se-

curities offered for listing, and will be in a position to give consideration to all such offerings.

"It is not the purpose of the New York Mining Exchange to supplant other exchanges throughout the country," an official announcement states, "but rather to supplement and cooperate with them, and by reason of its central location in the investment center of the world furnish both a national and international distribution not now available."

Harry S. Thayer, formerly connected with the United States Reduction and Refining Company of Colorado and more recently engaged as a consulting engineer, with headquarters in Colorado Springs, Colo., and Salt Lake City, Utah, has been retained as consulting engineer of the exchange.

Congressional Committee Will Hold Hearings on Silver Situation—Oddie Suggests Conference in Washington

With a view of developing information as to the effects of the depression in silver prices and means of stabilizing the price at a profitable point, hearings will be held at Washington, D. C., August 8 and later at western points by a subcommittee of the Senate Committee on Foreign Relations headed by Senator Pittman, of Nevada. The investigation will constitute a part of an inquiry into trade relations with China and the Orient, which are large markets for silver and will cover the effect upon American exports by the depreciation of silver. Other members of the investigating committee are Senators Johnson, California; Vandenberg, Michigan; Shipstead, Minnesota; and Swanson, Virginia. Hearings will be held at Los Angeles, San Francisco, Seattle, Spokane, Reno, Salt Lake City, and Denver.

Secretary of Commerce Lamont is considering a suggestion of Senator Oddie, of Nevada, for the calling of a conference of interested parties to consider the situation created by the decline in the price of silver.

Senator Oddie has suggested that the conference be held in Washington from December 9 to 11, at which time it is expected a large number of mining men will be in the city for congressional hearings and other business. In advising that the conference be confined to consideration of problems affecting the domestic silver situation, Senator Oddie says:

"Because of the serious and delicate conditions which prevail in some foreign countries with reference to the silver situation, a conference, to be successful, should be limited to consideration of domestic problems. If such a conference were to be held under auspices of the

Department of Commerce a great deal of valuable information would be made available in the course of discussion which would be of service to the Bureau of Mines and the Bureau of Standards in determining more accurately their respective programs of research so that the appropriations made available for this purpose will return the best possible results.

"Due to the silver crisis, I introduced a resolution providing for revision to date and republication of the currency and financial research work of the Senate Commission of Gold and Silver Inquiry and extension of that research into countries of Latin America and the Orient. The department cooperated in this work, and should this resolution be enacted the cooperation of the department would continue to be helpful. Shortly following these publications a number of countries provided for the minting of new silver coinages, and it is probable that a similar activity would result from the research work provided for under this resolution, thereby increasing the monetary demands for silver."

Anaconda Takes Up Silver Research

The Anaconda Copper Mining Company has directed the department of metallurgical engineers, which it maintains for study and experimentation in the promotion of commercial use of copper and zinc toward research work, to discover new uses for silver.

Increased practical usages for the white metal are sought within a price range to permit the widest use possible. Reports here indicate that that research in connection with silver will be conducted without regard to the established fineness of the metal as measured by sterling.

Members of Public Lands Commission Active in Studying Problems

Various members of the Committee on the Conservation and Administration of the Public Domain, appointed by President Hoover to make a study of and report on public domain problems, are actively engaged in a first-hand study of these problems in the Western States in anticipation of the next meeting of the committee in October.

Six of the members from the Western States have made arrangements to visit other states, with the problems of which they are least familiar, and learn at first hand of conditions to be discussed in the report to the President.

Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, a member of the committee, representing the State of California, has already left for the West,

where he will visit the Boulder Dam and a number of the irrigation projects and meet with other members of the committee as opportunity arises.

R. K. Tiffany, hydraulic engineer, of Olympia, Wash., a member of the committee from that state, has extended an invitation to the eastern members of the committee to visit the West during the summer with a view to becoming better acquainted with or refreshing their memories of problems relating to watersheds, reclamation, power, grazing, and minerals.

Public Lands Make Up Half of Area of Western States

The unreserved and reserved Federal lands represent somewhat more than half of the total area of the 10 principal public-land states: Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, and Wyoming, according to the Geological Survey.

These 10 states embrace 99 percent of the total of about 190,000,000 acres of the remaining unreserved public domain, which is an empire of vast extent, being nearly as large as the 12 Atlantic seaboard states from Maine to South Carolina, inclusive, plus the State of Pennsylvania. They also contain an additional area of about 206,000,000 acres of unreserved public land that has been dedicated to a wide variety of public purposes, of which national forests, with an area of nearly 132,000,000 acres, represent the largest single item.

The analysis by the Geological Survey indicates that agriculturally the surface of the unreserved public domain is useful chiefly for grazing, and it is generally recognized that an undetermined part of the reserved land is of the same character and that the use need in no wise interfere with any mineral value of any part of the land. Full utilization of the surface and the mineral estate does not conflict. A summary of the information compiled in the Geological Survey indicates that about 60 percent

of the unreserved land supports a desert or transition desert-shrub type of vegetation, much of which is worthless even for grazing; about 16 percent is of a transition mountain vegetative type, largely rocky and of nominal grazing value; about 4 percent is mountain grazing land generally of good value for summer range and similar to grazing lands in national forests; and the remaining 20 percent includes tracts which are scattered throughout regions where growing conditions are suitable for dry-farm development but which because of various factors have proved unsuitable for development under existing public-land laws.

Seek Embargo on Soviet Manganese Imports

Declaration of an immediate embargo against the importation of Russian manganese ore was requested July 30 by Senator Oddie, of Nevada, chairman of the Senate Mines and Mining Committee, in a letter to Assistant Secretary of the Treasury Lowman, in charge of customs affairs. The Senator, who was successful in restoring the manganese duty in the new tariff law after it had been eliminated by the Senate Finance Committee, states: "Since the 1930 tariff act became a law (June 17) the Soviet Government has reduced the price of Russian manganese ore so low that American producers of manganese have been compelled to shut down mines and plants. The Soviet manganese price is below the cost of production. Production losses are being justified and sustained in order to establish foreign gold credits for purchases of steel, machinery, and equipment required under the Soviet Government's industrialization program.

"When the Soviet Government adopts a policy to meet the American price without regard to the cost of production and the losses sustained, I submit that this constitutes 'dumping' of manganese ore on the American market and that this 'dumping' policy nullifies the provisions

of paragraph 302-a of the tariff act of 1930 and prevents the operation and development of the American manganese industry.

"A crisis exists in the American manganese industry which requires emergency relief by declaring immediately an embargo on the importation of Russian manganese ore.

"The question as to whether the manganese ore in Russia is produced by convict, indented, conscript, or forced labor arises. Soviet competition has some unusual factors which should be taken into account if the interests of American capital and labor are to be considered and adequately protected.

"Under such circumstances, the 'dumping' of Russian manganese ore on the American market, regardless of price, and the system of using convict, indented, conscript, or forced labor, the duty in the 1930 tariff act is too low to afford adequate protection to the domestic manganese industry. The most immediate and certain relief from such arbitrary and unfair manufacturing and selling practices is the declaration of an embargo on imports of Russian manganese ore.

"It is reported that representatives of the Amtorg Trading Company, the business organization of the Soviet Government in the United States, has stated that the consumers of manganese in this country are dependent on Russian manganese ore because of its superiority in grade to that of American origin. This statement has no foundation in fact. The manganese product of the Butte mines has for some time been used by the steel industry and preferred because of its freedom from objectionable impurities and its high grade of 60 percent manganese content, as compared with 50 percent for Russian ore. The products of other domestic mines have also been used and found superior to the Russian ore.

"The contention urged by the steel interests during the tariff debate that there were no satisfactory domestic ores

SILVER, COPPER, LEAD, AND ZINC IN THE CENTRAL STATES IN 1929

(Compiled by J. P. Dunlop, of the United States Bureau of Mines)

	Nor'n Ill.	Wisconsin	S. E. Missouri	S. W. Missouri	Kansas	Oklahoma
Total crude ore, etc., milled.....short tons..	*	697,100	6,439,600	428,400	5,321,100	9,324,600
Total concentrates in ore, etc.:						
Lead.....percent.....	0.36	4.32	0.33	0.63	0.55	
Zinc.....do.....	11.5	0.11	3.80	4.18	4.14	
Metal content of crude ore:						
Lead.....do.....	0.26	3.13	0.25	0.50	0.42	
Zinc.....do.....	3.53	0.06	2.26	2.48	2.42	
Average lead content of galena concentrates.....do.....	72.2	72.7	76.3	78.0	77.8	
Average lead content of lead carbonate concentrates.....do.....	30.6	58.1	60.3	59.3	58.3	
Average zinc content of sphalerite concentrates.....do.....	41.6	.....	40.2	.....	.....
Average value per ton:						
Galena concentrates.....dollars.....	78.61	75.61	82.31	86.08	83.61	
Lead carbonate concentrates.....do.....	.....	.....	61.96	59.75	.....
Sphalerite concentrates.....do.....	17.28	39.44	40.53	40.70	38.67	
Zinc silicates and carbonates.....do.....	24.60	.....	21.24	.....	.....

* No ore milled in 1929. Shipments in 1929 were 112 tons of sphalerite averaging 36 percent zinc.

The galena from southern Illinois (668 tons) had an average lead content of 67.7 percent, and that from Kentucky (496 tons) had an average lead content of 59.1 percent.

Copper ore from Michigan amounted to 7,598,180 tons and yielded 1.23 percent of copper. The quantity of concentrates produced from the treatment of this ore was 286,583,002 pounds.

has been completely dissipated by actual developments in the past two years. The production of marketable manganese from domestic mines in 1929 was 30 percent greater than in 1928, and the production recorded during the first few months of 1930 indicates that the production of this year will be approximately 200,000 tons, or an increase of about 400 percent over 1928, provided that there is a market for the ore.

"The present practices concerning the manufacture and 'dumping' of Russian manganese ores in the American market are indefensible from any national or humane viewpoint. As chairman of the Senate Committee on Mines and Mining and leader of the 1930 manganese tariff fight, I submit the question of declaring an embargo on the imports of Russian manganese ore."

Gold, Silver, Copper, Lead and Zinc in the Eastern States in 1929

The mines in the Eastern States yielded metals in 1929 valued as follows: Gold, \$36,793; silver, \$59,515; copper, \$5,992,082; and zinc, \$21,920,456, according to the United States Bureau of Mines. There was only one producer of lead, and the Bureau of Mines is not at liberty to publish the figures.

The value of the gold increased from \$35,097 in 1928 to \$36,793 in 1929. The placer gold reported amounted to \$3,216 and was derived from nine small operations in the States of Alabama, Georgia, and North Carolina. The lode mines yielded \$33,577 in gold, of which \$646 was from Georgia, \$3,969 from North Carolina, \$17,282 from Pennsylvania, and \$11,680 from Tennessee. Dry and siliceous ores milled in Georgia and North Carolina reported \$894 in gold shipped and a considerable quantity of gold in untreated concentrates. The copper ores

from Tennessee and North Carolina yielded \$15,401 and the pyritiferous magnetite ore from Pennsylvania yielded \$17,282.

The total production of silver was 111,660 fine ounces, of which 13 ounces was from placer bullion, 12 ounces from siliceous ore, 105,663 ounces from copper ore, and 5,972 ounces from copper concentrates shipped from Pennsylvania.

The mine production of copper was 34,045,920 pounds, from the Cullowhee and Fontana mines in North Carolina, the Ducktown Chemical & Iron Company and the Tennessee Copper Company properties in Tennessee, the Cornwall mines in Pennsylvania, and the National Copper Company in Vermont.

The only lead shipped in 1929 was from the Austinville mine of the Bertha Mineral Company, in Virginia. The Bureau of Mines is not at liberty to publish the figure.

The mine production of zinc in the Eastern States increased from 288,090,000 pounds in 1928 to 309,096,000 pounds in 1929. About two-thirds of the output is from the New Jersey Zinc Company mines in New Jersey. The other large producing properties were those of the St. Joseph Lead Company, near Edwards, N. Y., where a new mine was being opened; the Mascot, Universal, and Embree mines in Tennessee; and the Austinville and Ivanhoe mines in Virginia.

The total quantity of zinc ore mined and milled in the Eastern States in 1929 was 1,622,615 tons, that of copper ore 930,259 tons, and that of pyritiferous magnetite ore (which yielded 7,940 tons of copper concentrates) was 1,289,266 tons.

The number of producing mines that reported in 1929 was 9 placers and 16 lode mines.

Improvements in Steam Locomotive Efficiency Delaying Electrification of Railroads

Development of the steam locomotive through improvements to bring about increased power and efficiency without increasing proportionately the consumption of fuel has delayed the necessity for electrification of railroads in many instances, where, some years ago, it was believed traffic conditions required it, according to a report to the convention of the Mechanical Division of the American Railway Association at Atlantic City.

"The improvement and growth of the steam locomotive has made it more competitive with electric power," the report said. "It has not been necessary to resort to electrification, as the improved steam locomotive is meeting the requirements efficiently. The electric locomotive has been undergoing developments that have increased its possibilities in speed and power. Electric equipment is available in terms of speed and horsepower that exceeds anything that might be hoped for with the steam locomotive. There are in the United States 23 electrified sections on 18 railroads, aggregating 1,700 route miles and 4,000 track miles, operating 600 locomotives and more than 2,000 multiple unit cars. These electrified sections were installed to meet special requirements or local conditions, such as heavy grade tunnels, legislative requirements, or avoiding the building of second tracks.

"The Pennsylvania Railroad's projected electrification between New York and Washington and westward to Harrisburg, covering passenger, freight and switching service is the most complete and extensive electrification ever undertaken in this country. The New York Central has a projected program of electrification of its lines from New York to Buffalo."

MINE PRODUCTION OF GOLD, SILVER, COPPER, LEAD, AND ZINC IN IDAHO IN 1929

(In terms of recovered or recoverable metal)

Advance figures by C. N. Gerry, of the United States Bureau of Mines, Department of Commerce

County	No. of producers	Ore treated, short tons	Gold,* fine ozs.	Silver,* fine ozs.	Copper, pounds	Lead, pounds	Zinc, pounds	Total value
Ada	2	13	22.59	9	.....	.....	.....	\$472
Adams	1	42	5.32	311	26,512	.....	.....	4,942
Bear Lake	1	89	.....	293	.....	126,514	.....	8,078
Blaine	20	26,838	201.77	181,968	3,942	3,072,971	4,983,727	624,377
Boise	18	21,782	12,565.60	9,520	958	.....	4,182	285,260
Bonner	7	11,945	5.56	90,805	993	1,727,491	2,718	167,700
Bonneville	1	.....	9.72	.....	.....	.....	.....	201
Boundary	1	16	.....	83	122	7,297	.....	825
Butte	2	14,412	.....	56,375	46	3,751,144	.....	266,452
Camas	2	56	40.49	168	323	.....	.....	1,194
Clark	1	13	.....	48	.....	9,164	.....	603
Clearwater	4	.....	50.50	10	.....	.....	.....	1,049
Custer	17	92,405	2,535.04	246,579	2,837,398	4,679,135	.....	977,999
Elmore	6	17	38.70	21	.....	.....	.....	811
Gem	2	300	59.65	581	90	4,180	.....	1,819
Idaho	17	2,898	2,269.37	3,259	75	684	.....	48,699
Lemhi	2	44	7.26	36	8,273	.....	.....	1,625
Latah	28	27,551	454.34	15,496	914,519	695,640	.....	225,017
Owyhee	12	202	1,216.58	8,208	.....	.....	.....	29,524
Shoshone	46	1,971,580	510.65	8,776,726	1,320,700	283,115,336	86,092,294	28,439,351
Twin Falls	3	.....	20.22	2	.....	.....	.....	419
Valley	3	3,729	228.57	17,783	9,366	156,459	272,068	43,665
Washington	2	193	1.65	5,212	7,824	36,111	.....	6,464
Total, 1929	198	2,174,125	20,247.11	9,414,408	5,131,438	297,389,488	91,350,807	\$31,104,248
Total, 1928	207	2,064,329	20,980.38	8,996,330	2,072,165	290,645,905	62,526,648	\$26,667,708

* Includes placer production. † Average value of metals: Gold, \$20.671835 per ounce; silver, \$0.533 per ounce; copper, \$0.176 per pound; lead, \$0.068 per pound; zinc, \$0.066 per pound. ‡ Average value of metals: Gold, \$20.671835 per ounce; silver, \$0.585 per ounce; copper, \$0.144 per pound; lead, \$0.058 per pound; zinc, \$0.061 per pound.
(June 16, 1930)

Anthracite Miners and Operators Reach New Agreement

A new wage and working agreement between the United Mine Workers and the anthracite operators was reached on July 18. Negotiations had been in progress in New York City between the representatives of the miners and operators since June 30.

The new agreement, which must be ratified by the operators, the largest of which were represented at the conference, and the miners themselves, will go into effect September 1, superseding the old agreement which was signed February 17, 1926, ending the great coal strike of that winter. It is to run until April 1, 1936.

The miners have been called into convention August 4, at Scranton, Pa. Their approval of the pact is expected.

The agreement provides for no decrease in salary, a modified form of the check-off, or collection of union dues by the operators, payment of miners by check, and the establishment of a permanent committee of 12 men to "consider and discuss all questions arising under this contract relating to cooperation and efficiency and performance of the contract by the parties and the relations of the parties which either party may present for consideration and discussion."

A joint statement was issued by John L. Lewis, international president of the United Mine Workers, and W. W. Inglis, president of the Glen Alden Coal Company, of Scranton, heads of the two delegations, praising the agreement as a "remarkable contribution to the stability of American industry and American prosperity."

The statement said:

"We are gratified to confirm the negotiations of a new agreement that will spell industrial peace in the anthracite region after the expiration of the present contract for a further period of five and a half years. This will mean an unbroken era of peace in this great industry for approximately 10 years, and, in our estimation, will be a remarkable contribution to the stability of American industry and American prosperity."

PRESENT WAGE TO CONTINUE

"The agreement is predicated on a continuation of the present wages and will speak for itself. It also provides in a comprehensive fashion the working out of a concrete program of cooperation and efficiency between the operators and the mine workers. It provides for mutual accommodation to each other in working to carry on a great industry."

"The arrangement for the collection of dues is a practical arrangement. It will reduce operating expenses in the mine workers' organization. In consideration for this accommodation and convenience, the agreement provides for

practical cooperation of the mine workers with the operators in promoting efficiency without decreasing the miners' earnings.

"The arrangement set forth in the contract for meetings from time to time by representatives of the negotiating parties will, in our estimation, prove to be a vehicle for the extension of the good will now existing in the industry and the promotion of its well-being. We feel that not alone the operators and mine workers but the citizens of the anthracite communities and the nation as well are to be congratulated on the successful outcome of this conference."

Blakslee Goes to Philadelphia & Reading

S. W. Blakslee, general manager of the Pennsylvania Coal & Coke Company, has resigned that position to accept a place on the staff of the Philadelphia & Reading Coal & Iron Company. As we go to press, further details are not available.

Alabama Holds First Aid Meet

One of the outstanding first-aid contests held this season was under the auspices of the Alabama Mining Institute, at Birmingham, July 12, at the Municipal Auditorium. Twenty-six teams competed. Several thousand miners and operators, as well as others interested in first-aid and safety work, were in attendance. The first prize was won by Team No. 6 of the DeBardeleben Coal Corporation, with a score of 99.4 out of a possible 100. Second prize was won by Team No. 15, of the DeBardeleben Coal Corporation, with an average score of 98.9. The first-prize winner in the colored-team competition was Team No. 25, of the Alabama By-Products Corporation, with a score of 97.6, while Team No. 26, of the DeBardeleben Coal Corporation, took the second prize. Team No. 16, of the Boy Scouts, representing the DeBardeleben Coal Corporation, won first prize, a loving cup presented by the Alabama Mining Institute. J. D. Battle, traffic manager of the National Coal Association, presented the prize offered by that organization, which was won by Team No. 6.

DeBardeleben Installs New Tipple and Washery at Hull No. 33

The DeBardeleben Coal Corporation has begun an extensive improvement program at its Hull No. 33 mine, in Walker County, Ala. A new opening will be made to the mine on the Empire branch of the St. Louis & San Francisco Railroad, which will be about three-quarters of a mile nearer to Dora, Ala.,

than the old entrance. It is planned to construct a new tipple, coal washery, and track facilities for handling expeditiously a maximum production of 2,000 tons per day as against the 900 tons now being produced, and will effect economies in operations which are always being sought in the industry. The corporation is also expending various sums at other of its operations in Walker County to effect savings in cost and enable increased production and improvement in the preparation of the product for the trade. The DeBardeleben Corporation, of which Henry T. DeBardeleben is president, and Milton Fies operating vice president, is the largest producer of commercial and domestic coal in the district.

Snodgrass Heads Colorado & New Mexico Coal Operators' Association

At the annual meeting of the Colorado & New Mexico Coal Operators' Association, held in Denver recently, B. W. Snodgrass, president of the Victor-American Fuel Company, Denver, Colo., was elected president; H. H. Bubb, general superintendent, Cokedale plant, American Smelting & Refining Company, Cokedale, Colo., vice president; and F. O. Sandstrom was reelected secretary-treasurer. The meeting was marked by interesting discussion, after which a code of ethics was adopted similar to that in effect in Utah.

The following members were elected directors of the association for the ensuing year: W. D. Brennan, president, Utah Fuel Company, Salt Lake City, Utah; H. H. Bubb; G. C. Davis, manager, Phelps Dodge Corporation, Dawson, N. Mex.; Everett Drennen, vice president, Colorado Fuel & Iron Company, Denver, Colo.; A. N. Fancher, vice president, Colorado & Utah Coal Company, Denver, Colo.; George B. Dick, president, Jewell Collieries Company, Walsenburg, Colo.; R. E. Perry; P. E. Rinehart, sales manager, Oakdale Coal Company, Denver, Colo.; B. W. Snodgrass; H. Van Houten, president, St. Louis, Rocky Mountain & Pacific Company, Raton, N. Mex.; F. R. Wood, president, Temple Fuel Company, Trinidad, Colo.

Anthracite Shipments—June, 1930

Shipments of anthracite for the month of June, 1930, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 4,052,939 gross tons. This is a decrease as compared with shipments during the preceding month of May of 697,429 tons, but when compared with the month of June, 1929, shows an increase of 274,260 tons.

Describes New Method of Treating Coal to Reduce Dust

The chemical treatment of coal for domestic use for the purpose of allaying dust, a comparatively new development, was described by I. L. Miller, commissioner of weights and measures of Indiana, before the annual conference of weights and measures officials at the Bureau of Standards, early in June. "The treatment adds nothing to the fuel value of the coal, but is intended solely to eliminate the dust nuisance both while delivering and in handling while firing," said Mr. Miller. "Dealers who have sold treated coal and those who have used it are apparently unanimous in their opinion that the treatment effectually serves the purpose intended. Calcium chloride forms the basis of all the chemical compounds used in the treatment with magnesium salts used in combination. Coal wet down with water dries out, but coal treated chemically remains free from flying dust for at least one year. Chemically treated coal reduces smoke. The treated coal has a tendency to burn cleaner and better. Chemically treated coal also reduces slack, the treatment tending to seal, to a certain extent, moisture in the pores of the coal. Two types of apparatus are used in applying the chemical to the coal. The simpler type consists of an elevated tank in which the solution is prepared and an attached hose equipped with spray nozzle through which the solution is applied to the coal. The more efficient type includes a tank, pump and electric motor, together with the necessary high-pressure hose and spray nozzles. In this latter type the tank is equipped with a special agitator which mixes the water and chemicals. The solution is pumped through a hose with spray nozzles under a pressure ranging up to 300 pounds.

"Three methods of treating coal are in general use. In the first method, the one which is least used, the solution is sprayed upon the coal after loading into the truck. This method is least efficient, since the chemical is not evenly distributed throughout the load. In the second method, two or more spray nozzles are attached at the top of the elevator used in conveying the coal from the car into the dealer's bin. This method is efficient, since all the coal receives an even spray. In the third method the chemical is applied at the mine as in the preceding manner. Treatment at the mine seems to be most popular with the retailer, since the larger portion of treated coal sold is mine treated. The cost of treatment varies. One company marketing the prepared saturated chemical solution which requires dilution with 11 parts of water claims that coal in lots of 500 tons can

be treated by the dealer for 6 cents per ton. Another large manufacturer of a treatment compound stated that the cost is 25 cents per ton in the case of low-volatile coals and from 15 to 20 cents per ton in the case of harder coals.

"The chemical treatment of coal has become well established, and there is reason to believe that the sale of treated coal will continue to increase."

The conference went on record to the effect that this method is not objectionable from a weights and measures standpoint provided that the treatment does not increase the weight per ton by more than 30 pounds, and provided that such coal is represented in advertising and billing as "chemically treated" coal.

Pocahontas Operators Score Important Victory in Trade Name Case

Pocahontas coal operators of West Virginia won an important decision in the United States District Court for the Southern District of Indiana which, according to the National Coal Association, will have a vital effect on the use of trade names and trade-marks throughout the coal industry. The decision was handed down July 9 in the shape of a permanent injunction against 16 retail coal dealers and 1 jobber, of Indianapolis, forever enjoining them from selling any coal other than that produced in the Pocahontas coal field as "Pocahontas coal," either separately or in mixtures.

There have been two previous cases involving the use of the trade name "Pocahontas," but they were cases between selling agents and producers operating in the Pocahontas field. The decision this week sets a precedent which will likely be followed by coal operators in other fields in the protection of their trade names. Several coal districts have been watching the progress of this case through the courts, having in mind securing similar protection for their brands or trade names.

The history of the Indianapolis case might be duplicated in a number of other important consuming cities. In January, 1928, the city of Indianapolis chose a new mayor and secured an independent official who proceeded to fill the appointive offices with efficient men. As city coal inspector, C. A. Howe was chosen because of his knowledge of the coal business. His methods were reasonable as far as the coal trade was concerned, and in due time the sheep and goats were separated. It became necessary to institute prosecutions against offenders for short weight and substitution of other coals for the trade-marked brands. One conviction was obtained, but afterwards the city ordinance was nullified on a technicality. During the

crusade the Pocahontas Operators' Association was appealed to for aid on account of the infringements of its trade-name rights, and W. E. E. Koepler, secretary, made frequent visits to Indianapolis, investigating conditions. Finally, Pocahontas operators decided to apply to the Federal Court for an injunction, and the case came to trial June 6. A long list of operators, retail coal dealers, and consumers testified.

The defendants in this case were selling coal that in no way resembled Pocahontas coal. Only a few cases were found where they had sold coal which was similar in analysis to Pocahontas coal. They had a number of brands, some of them registered as trade-marks in the state house at Indianapolis. Some of these were: "Wonder Pocahontas," "Banner Pocahontas," "Semi-Pocahontas," "Pocahontas Fracture," etc., and a number of them were selling mixtures of some Pocahontas coal with other coals and calling it by various names. All of these practices were condemned by the court and forever enjoined. An effort was made to prove that the substitutes were as good or better than Pocahontas coal for some purposes, but even a better coal may not be sold as "Pocahontas coal," though it come from related seams correlated geologically as of the same nature. Geology has nothing to do with trade-name law; neither have chemical characteristics any bearing on trade-name rights.

Coal-Mine Fatalities in June

Accidents in the coal-mining industry of the United States in June resulted in the death of 119 men, according to information received from state mine inspectors by the United States Bureau of Mines. Twenty-five men were killed in the anthracite mines of Pennsylvania; the remaining 94 deaths occurred in bituminous mines in various states. The production of bituminous coal during the month was 33,714,000 tons and anthracite mined amounted to 5,183,000 tons. Thus for every million tons of bituminous coal mined in June there was a corresponding death rate of 2.79, while that for the anthracite coal produced showed a fatality rate of 4.82, and for the industry as a whole a rate of 3.06 was shown. This record is more favorable than that for June a year ago, when there were 123 deaths, 38,580,000 tons of coal mined, and a fatality rate of 3.19 in the bituminous coal fields, and a rate of 7.30 per million tons, based on 37 deaths and 5,069,000 tons of coal for the anthracite mines. For both bituminous and anthracite mines combined, the death rate for June last year was 3.67, based on 160 deaths and 43,649,000 tons of coal. The month of June, 1930, also showed an im-

provement over the preceding month of May when there were 108 deaths in bituminous mines, 32 in anthracite mines, with a total of 140. During May 35,954,000 tons of bituminous coal and 5,947,000 tons of anthracite were mined, the death rates per million tons of coal produced being 3 for bituminous, 5.38 for anthracite, and 3.34 for the industry as a whole.

Reports made to the Bureau of Mines for the first six months of 1930 showed a total of 979 deaths from accidents in coal mines as compared with 1,013 for the same period of 1929. The production of coal thus far in 1930 is 264,426,000 tons, showing a death rate of 3.70; that for the period January to June, 1929, was 293,445,000 tons, with a fatality rate of 3.45. Separated into bituminous and anthracite groups the rates for the six-month period of 1930 were 3.33 and 6.21, respectively, while those for the same period of 1929 were 3.08 and 6.02, respectively.

There were no major disasters during June—that is, there was no disaster in which five or more lives were lost—but there were seven major disasters during the preceding months of 1930 which caused the death of 88 men. During the corresponding six-month period of 1929, there were four major disasters with a total of 75 deaths. Thus the death rate from major disasters was 0.333 per million tons of coal produced in 1930 and 0.256 in 1929.

Comparing the accident record for the first six months of 1930 with that for the same period of 1929, a reduction is noted in fatality rates for haulage and explosives, but increased rates are shown for falls of roof and coal, gas or dust explosions, and electricity, the other principal causes of accidents.

Coal Utilization Exhibit at Chicago World's Fair in 1933

Chemical utilization of coal is likely to be the subject of an exhibit under the chemistry section of the science display at the Chicago World's Fair in 1933. Such a proposal is contained in a report of the chemical division of the National Research Council Science Advisory Committee, a group of leading engineers under whose direction the chemistry exhibits at the fair will be staged.

It is proposed to show models of the various types of equipment used in the first treatment of coal, such as the beehive coke oven, by-product coke oven, and the vertical and horizontal retorts used in gas making. It is suggested that some of these models be obtained from the Koppers Company in Pittsburgh, the Tennessee Iron and Coal Company, Birmingham, the Ford Motor Company's

Detroit plant and the Piron Coal Distillation System, Inc., New York City.

The exhibits would also show the primary cooling apparatus through which the hot gases from the by-product coke oven, the retorts and low temperature carbonization processes pass, the apparatus for removing some of the tar, chiefly the heavy oils from the by-product gases, tar extractors for removing the last of the tar, ammonia scrubbers for washing with water, ammonia saturators for washing with acid to form ammonia sulphate, and the coolers and absorbers or washers for removing the light oil vapor by absorption in a heavy washing oil. The Semet-Solvay Company, Syracuse, the Koppers Company and the American Gas Association are named as organizations which might furnish models or illustrative material to exemplify the foregoing processes.

The exhibit would include a display of the products of the various coke ovens, showing the quality, structure, form and size.

Other exhibits would consist of models of various types of distillation apparatus along with the products of distillation, showing in the order of their appearance from the stills the light oils, the heavy oils, the tar and the pitch.

The National Research Council Science Advisory Committee is a group of about 40 of America's foremost leaders in the various fields of scientific achievement who, under the chairmanship of Dr. Frank B. Jewett, vice president of the American Telephone and Telegraph Company, are collaborating with the Chicago World's Fair management in developing a science pattern for the exposition.

Dr. Arthur D. Little, of Cambridge, Mass., is chairman of the chemistry section of the Science Advisory Committee. His associates are for the most part heads of the chemistry departments of colleges and universities or connected with representative industrial laboratories.

Production of Coal in June

The total production of bituminous coal for the country as a whole during the 25 working days of June is estimated by the Bureau of Mines at 33,714,000 net tons, as against 35,954,000 tons for the 26.4 days in May. The average daily rate of output in June was 1,349,000 tons. Compared with the average daily rate of 1,362,000 tons for May, this shows a decrease of 1.0 percent.

The production of Pennsylvania anthracite in June is estimated at 5,183,000 net tons. The average daily rate of output in June was 207,000 tons, a decrease of 22,000 tons, or 9.6 percent, from the daily rate for May.

Anthracite Institute Establishes Research Laboratory

A laboratory equipped with all modern facilities for testing every type of fuel and heating equipment has been established by the Anthracite Institute at Primos, Pa., according to an announcement by Noah H. Swayne, executive director of the institute. The equipment has been installed under the direction of Allen J. Johnson, director of the laboratory, formerly combustion engineer with the Anthracite Coal Service, and consists of a complete battery of boilers ranging in size from the small, round, jacketed heater to the large 50-hp. apartment-house boiler.

Every precaution has been taken to insure the obtaining of both complete and accurate information on equipment and methods of combustion. The latest type of approved automatic recording and indicating instruments have been installed. Permanent piping and wiring arrangements allow any boiler in the building to be connected to the instruments at a central point. Typical features assuring accuracy of tests include such factors as double valves at all vital points, three separate methods of water measurement and an inventory of coal used in the laboratory.

A careful study will be conducted to increase the efficiency and convenience of equipment designed to burn all sizes of anthracite.

The standardization of anthracite installations, from chimney to ashpit, is expected to result from the extensive studies and tests which will be made at the laboratory. Initial tests and development will include a full consideration of mechanical ash-removal methods, an investigation into the practicability of using the main house heater for furnishing hot water during the summer, a thorough test of several inventions for feeding large coal both automatically and by magazine, experimental work with a device for coaling the fire and shaking the ashes, the complete testing of various types of thermostatic control and the chemical removal of scale and dirt from boiler tubes.

Montana Coal Mine Resumes Operations

After having been closed down for almost three months to permit extensive improvements, the Klein mine of the Republic Coal Company, of Roundup, Mont., has resumed operations. The improvements included the erection of a new tippie and the installation of nine mechanical loaders. With no urgent demand for coal at this time, it is expected that it will be several months before capacity production is attained and the full force of several hundred men employed.

Bureau of Mines' Official Condemns Use of Calcium Chloride to Reduce Explosions

A proposal suggesting the use of calcium chloride in dusty coal mines to reduce explosions, which appeared in the press in various sections of the country recently, was characterized by George S. Rice, chief mining engineer of the U. S. Bureau of Mines, as only a repetition of history, in that in 1879 Professor Stokes, in Great Britain, suggested the use of calcium chloride, and Professor Abel, giving evidence before the British Accidents in Mines Commission in 1881, said "it might possibly be desirable to try for watering purposes a solution of calcium chloride." Sir Henry Hall made trials of it in a tunnel in England in 1908.

When the United States Government first took up mine accident investigations in 1908, Mr. Rice points out, it began testing all practical methods of preventing coal-dust explosions. Among other things, calcium chloride was experimented with in the Catsburg mine, in the Pittsburgh district, with the view of laying the coal dust. The results of this were published by the U. S. Geological Survey, in Bulletin 425, 1910, reprinted (1911) as Bulletin 20 by the Bureau of Mines, who took over that work on its establishment in 1910. In that bulletin it was reported that while the calcium chloride caused mine dust to pack down, the results as a coal-dust-explosion preventive were not conclusive. Nevertheless, certain mine operators in the Pittsburgh district and in West Virginia tried it. Among the mines where it was systematically used was the Cincinnati mine, in the Pittsburgh district. This mine experienced a disastrous explosion in 1913, which swept practically throughout the mine and resulted in the death of 96 men.

An examination by the mining engineers of the bureau showed that while in the roadways much of the road dust was packed down tightly, this did not prevent coal dust newly made from the daily operation of the mine falling on this hard surface of the roadways, and it was this dust that was swept into the air and propagated the explosion.

As a result of this disaster, the Bureau of Mines has since discouraged the use of calcium chloride as a means of preventing the propagation of coal-dust explosions in mines, and about that time (1913) the bureau officially decided that rock dusting was the only known practicable means which on test had shown itself to be an effective preventive of propagation of explosions. This has received ample confirmation since then by test and practice. Mine operators have widely adopted its use, and it has been officially adopted by the mining departments of the principal coal-mining states.

Director of Bureau of Mines Abroad

Director Turner, of the Bureau of Mines, has gone abroad to confer with the heads of the mining departments of various European nations with the object of obtaining information regarding the latest developments in those countries along the lines of safety and efficiency in mining and technologic research in the mining and metallurgical fields. He will visit England, France, Germany, Switzerland, Holland, Belgium and possibly Sweden.

Pruden Coal and Coke Wins Tennessee and Southeastern Kentucky Meet

Before a crowd of approximately 3,000 persons, Team No. 1, of the Pruden Coal and Coke Company, won highest honors at the sixteenth annual miners' field day for Tennessee and southeastern Kentucky, held recently at Middlesboro, Ky. The meet was held under the auspices of the Southern Appalachian Coal Operators' Association, the Tennessee Department of Mines, the Kentucky Department of Mines, the Southern Appalachian Efficiency Association, and the U. S. Bureau of Mines. The score of the winning team was 99.60. Coalfield Coal Company was second with 98.95, and Team No. 2, of the Cambria Coal Company, third, with 98.70. The winning team received a cup trophy, awarded by the National Coal Association, as well as a banner donated by the Southern Appalachian Coal Operators' Association, and other prizes.

Pennsylvania Mine Official Retires

Frank Hall, of Harrisburg, Pa., deputy secretary of mines of Pennsylvania since 1903, has retired because of impaired health after a service with the state for 45 years. Mr. Hall entered the Department of Internal Affairs in 1885, and when the Department of Mines was created in 1903 he was appointed to the position he has held since.

Report Soon in Trade Commission Power Inquiry

The Federal Trade Commission will shortly issue a report on its interstate power inquiry. It will show the amount of electric energy generated and consumed, exports and imports, by states for 1929; gross and net movement of electric energy in each direction between states, by boundaries (pairs of contiguous states), for 1929; classified voltages of interstate electric lines and kilowatt hours moved at each, by boundaries, for 1929; names of companies sending and receiving electric energy across state lines; and companies operating electric generating, transmission or distribution

equipment in two or more states without interstate physical movement of electric energy between divisions for 1929.

Instructions Issued for Testing Validity of Oil Shale Patents

In instructions to the field service concerning patent to oil-shale lands, Secretary of Interior Wilbur states that in order for the Government to make a lawful challenge to the validity of an oil-shale claim for failure to do the annual assessment work in any patent proceedings, it must do so at a time when there is an actual default and no resumption of work, and prior to the time the patent proceedings, including the publication of notice, have been completed.

By this decision the department sets aside instructions issued last February following a Supreme Court decision in the Krushnic case. In that ruling it was held that default in performance of assessment work on an oil-shale placer, for the period immediately preceding the date application for patent was filed, rendered the claim subject to challenge by the United States, because of such default, at any time prior to the issuance of patent.

In the latest ruling the department says:

"If no third party could challenge such a claim after the period of publication, the Government may not do so because it stands in no better position under the law and the decision than do third parties mentioned in such section and, therefore, can not challenge the claim for default in assessment work after publication has been completed. In other words, where, as in this case, patent proceedings have been instituted and the requisite expenditure has been made, the applicant has shown compliance with the law in maintaining the claim, no challenge can, at this late date, be made against the claimants because of failure to perform annual labor. Such challenge must be at a time when under the law adverse claimants could assert their rights."

Company Takes Group Insurance

Fifty-one employees of the Pittsburgh County Coal Co., of Carbon, Okla., have recently been covered with group life insurance protection by a policy issued through the Prudential Insurance Company of America for a total of \$59,500.

Each worker receives insurance protection of from \$1,000 to \$2,500, the amount being based on the rank or position held, and the policy is of the contributory type, the employees and the employing company sharing in the payment of premiums.

Fuller's Earth in 1929

The fuller's earth sold or used by producers in the United States in 1929 amounted to 315,983 short tons, valued at \$4,309,723, according to the United States Bureau of Mines, which has collected statistics in cooperation with the Geological Surveys of Florida, Georgia, Illinois, and Texas. This is an increase of 10 percent in quantity and value compared with 1928. Every producing state except Nevada showed an increase in sales, and one state that reported for 1928—Arizona—reported none for 1929. The output was reported by 17 operators in 7 states in 1929, namely, Colorado, Florida, Georgia, Illinois, Massachusetts, Nevada, and Texas. Georgia was the leading state in production in 1929, with Florida second and Nevada third. These three states produced 78 percent of the total output. The average value per ton of fuller's earth was \$13.64 in 1929, compared with \$13.57 in 1928.

Fuller's earth is used almost exclusively in the bleaching or filtering of mineral and vegetable oils and animal fats, 99 percent of the domestic output being used for these purposes in 1929; the remainder was used as a filler, a binder, for fulling cloth, etc.

Until 1895, when fuller's earth was successfully produced commercially in Florida, the United States was entirely dependent on foreign supplies. In 1929 the imports of fuller's earth were 8,302 short tons, valued at \$152,432, an increase of 9 percent in quantity and 15 percent in value compared with 1928.

The exports of fuller's earth are not separately shown in the official records of the foreign commerce of the United States but 7 producers reported to the Bureau of Mines that in 1929 they exported 21,264 short tons of fuller's earth, which was an increase of 29 percent over 1928.

Feldspar in 1929

The crude feldspar sold or used by producers in the United States in 1929 amounted to about 197,699 long tons, valued at \$1,276,640, or \$6.46 a ton, according to reports obtained directly from producers by the United States Bureau of Mines, in cooperation with the Geological Surveys of Maryland, New York, North Carolina, South Dakota, and Virginia. These figures show a decrease of 6 percent in quantity and 10 percent in total value compared with 1928. Feldspar was mined and sold in 1929 in 12 states, namely, Arizona, California, Colorado, Connecticut, Maine, Maryland, New Hampshire, New York, North Carolina, Pennsylvania, South Dakota, and Virginia. The greatest feldspar-producing region is that which includes the Atlantic Seaboard States, from Maine to North Carolina. This region reported about 91

percent of the total quantity and value in 1929. North Carolina, the leading state, reported about 52 percent of the total output; New Hampshire, the second state, reported 16 percent; and Maine, the third state, 10 percent. The average value per long ton in North Carolina was \$5.80; in New Hampshire, \$7.49; and in Maine, \$7.10.

Except for minor purposes, feldspar is prepared for use by grinding. This work is done principally by commercial mills; only a very small portion is ground by users in their own mills. In 1929 there were 33 commercial mills operated in 13 states, namely, California, Connecticut, Illinois, Maine, Maryland, New Hampshire, New Jersey, New York, North Carolina, Ohio, South Dakota, Tennessee, and Virginia. These mills reported 230,582 short tons of ground feldspar sold in 1929, valued at \$3,296,252, or \$14.30 a ton, compared with 227,657 tons, values at \$3,459,028, or \$15.19 a ton, in 1928, an increase of 1 percent in quantity but a decrease of 5 percent in value. Of the quantity sold in 1929 209,808 short tons, valued at \$2,880,824, or \$13.73 a ton, was domestic feldspar, and 20,774 tons, valued at \$415,428, or \$20 a ton, was imported feldspar. Imported feldspar was ground in two states in 1929—New York and Ohio. These figures represent a decrease in imported feldspar as compared with 1928.

Sales of Clay in 1929

The quantity of clay sold by the producers in the United States in 1929 amounted to 4,347,020 short tons, valued at \$14,850,744, according to a statement made public by the Bureau of Mines. These figures show an increase of 8 percent in quantity and 5 percent in value compared with 1928. They represent only clay sold as clay or mined under royalty, and do not include the much greater quantity of clay that was burned into clay products by the producers themselves from their own property. The leading five states, in the order of clay sold, were Pennsylvania, with 24.3 percent of the total quantity; Missouri, with 11.5 percent; Ohio, with 9.5 percent; California, with 7.1 percent; and Georgia, with 6.6 percent. The data were collected direct from producers in 44 states and in cooperation with the State Geological Surveys of Alabama, Florida, Georgia, Illinois, Iowa, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Oklahoma, Texas, Virginia, Washington, and Wisconsin.

The sales of kaolin, the clay that is used in making high-grade pottery and porcelain, as well as paper, oilcloth, and other products, and which is generally considered the highest grade of clay, amounted to 518,169 tons, valued at

\$4,281,301, an increase of 4 percent in quantity and 5 percent in value as compared with 1928. The clay of largest quantity and value is fire clay. The sales of fire clay in 1929 were 3,178,865 tons. This was 14 percent more than those of 1928, and was the largest recorded. The value of the fire clay sold in 1929 was \$8,107,796, an increase of 8 percent as compared with 1928.

The imports of clay decreased in quantity but increased in value in 1929 as compared with 1928. The imports of clay amounted to 369,596 short tons, valued at \$3,543,154, a decrease of 0.2 percent in quantity but an increase of 1 percent in value. Kaolin, or china clay, constituted 76 percent of the total imports in 1929. Exports of clay in 1929 amounted to 153,350 tons, valued at \$1,706,082, an increase of 27 percent in quantity and 23 percent in value as compared with 1928. Exports of fire clay amounted to 50 percent of the total.

Production of Asbestos in 1929

The total quantity of asbestos sold or used by producers in the United States in 1929 was 3,155 short tons, valued at \$351,004, according to figures compiled by the Bureau of Mines from individual reports furnished by producers. These figures represent 1,983 short tons of chrysotile, valued at \$317,584, mined in Arizona and Vermont, and 1,172 tons of amphibole, valued at \$33,420, mined in Georgia, Maryland, Montana, and North Carolina. As compared with 1928, figures for chrysotile showed an increase in quantity, but a decrease in value, while amphibole showed increases in both quantity and value.

In Arizona the average values for total crude asbestos (Nos. 1, 2, and 3) was about \$300; ranging from \$450 to \$600 a ton for No. 1; from \$225 to \$500 a ton for No. 2; and from \$75 to \$275 a ton for No. 3. The average value for all mill fiber asbestos sold in Arizona (Nos. 1, 2, and 3) was \$171.

Imports of unmanufactured asbestos for consumption amounted in 1929 to 262,427 short tons, valued at \$11,153,017, divided as follows: Crude, 16,976 tons; mill fiber, 95,384 tons; refuse, 150,067 tons. Corresponding total figures for 1928 were 230,595 short tons, valued at \$9,017,891. Exports in 1929 were 709 short tons of crude, valued at \$105,467.

Southern Conference Proceedings Available

Printed copies of the proceedings of the Industrial Development Conference held by the Southern Division of the American Mining Congress at Little Rock last March are now available. The report is a document of 180 pages and is available on request to the American Mining Congress.

WITH THE MANUFACTURERS

Westinghouse-Nuttall SH and DH Speed Reducers

Types SH and DH speed reducers are new Westinghouse-Nuttall standard single and double reduction units for use in general industrial and mining operations.

They are of the non-planetary design, with shafts arranged in a horizontal plane, and have either right or left hand assembly as desired.

Both types are made in 12 sizes, providing a total of 28 standard reduction



ratios, ranging from 2.82: 1 to 70.5: 1 and having capacities of 1 to 635 hp.

In Type SH units efficiency at full load is from 98 to 99 percent and in Type DH units 96 to 98 percent.

These speed reducers are conservatively rated on the basis of torque to be transmitted in continuous service, with ample allowance for 100 percent overloads occurring at starting and momentarily during operation.

The Westinghouse-Nuttall single-helical gearing has been adopted as standard for these units following their outstanding success in many hundreds of installations.

Gears are hobbled from forged blanks of .40-.50 carbon steel for all except a few of the largest units, the gears for which are hobbled from thoroughly annealed cast steel.

High-speed pinions and shafts are forged from .40-.50 steel heat-treated by the Westinghouse-Nuttall BP "tough-hard" process, which produces much greater load-carrying capacity and resistance to wear and shock than the untreated material would provide. After being heat-treated, pinion teeth are recut to assure extreme accuracy.

A long and short addendum tooth form with full depth teeth is used to give maximum strength and tooth overlap, the latter being especially desirable, because at least two teeth are always in contact and carrying the load. This tooth form gives added assurance of low frictional losses, quiet operation and long life in helical gearing.

Other advantages obtained with helical gearing are freedom from necessity for close axial alignment of pinion and gear and retention of original tooth form permitting a new pinion to be mated with a worn gear or vice versa.

The shafts of all units are machined from heat-treated .40-.50 carbon forged steel.

In Types SH and DH units the advantages peculiar to Timken and Hyatt bearings have been embodied. A single Timken bearing is used at each end of all high speed and intermediate shafts. On low-speed shafts a Hyatt bearing is used at the extension end and a double Timken bearing at the closed end.

Cast from a fine grade of close-grained grey iron, the two-section cases are generously proportioned and ribbed at the points of greatest stress, providing ample strength and rigidity to insure proper alignment of unit and parts. Adjoining faces of the two sections are accurately machined and securely held together with through-bolts, forming an oil-tight, dust-proof joint without the use of gaskets. At the bearing seats these bolts are of extra size.

Thorough lubrication of the gearing and bearings is supplied by a simple but positive splash system. The bottom section of the case serves as the reservoir for lubricating oil. This oil reservoir has two compartments. Oil returns to the smaller compartment where any sedimentary particles are precipitated and then passes into the main chamber into which the low-speed gear dips. This arrangement prevents excessive churning and extraordinary heat. A bayonet type oil gauge is provided on the outside of the lower section of the case for checking the oil level. A removable plug in this gauge permits complete drainage of the oil from the case.

Bedplates of welded steel construction, with or without supports for outboard bearings, are available for all sizes of Types SH and DH units.

S K F Develops New Type of Felt-Seal Ball Bearing

S K F Industries, Inc., has developed a new type of patented felt-seal ball bearing possessing a number of distinctive features which mark a radical improvement in this type of bearing. A felt seal is provided as an integral part of the bearing, thus making it necessary for the machine manufacturer to provide only one housing enclosure.

The outer and inner races as well as the balls in the S K F felt-seal bearing are made of high carbon, chrome alloy steel hardened throughout. The bore and outside diameter are ground to international standard dimensions and tolerances, the same as the corresponding standard single row bearings. The width, however, is slightly greater than the standard dimension of a single row bearing in order to accommodate the felt seal. The tolerances on eccentricity of the outer and inner races are also international standard tolerances for single row ball bearings.

The inner race projects a little beyond the face of the seal in order that the bearing may be pulled off the shaft at any time without the possibility of damaging the seal plates.

The seal consists of an inner steel plate which is dished at its periphery and bears against a shoulder formed on the outer race. A removable felt of substantial size comes next, then a dished steel end plate, after which a split steel ring is fitted into a groove in the outer race to hold the assembly in place. An idea of the construction and the relation of the various parts can be gained by reference to the cross-sectional view of the S K F felt-seal ball bearing.

An outstanding feature of the design is the ease with which the seal may be disassembled at any time and new felts applied. To disassemble the seal, it is merely necessary to spring the split steel ring out of the groove in the outer race, after which all the other component



parts of the seal may be readily lifted out. The entire procedure of disassembling and reassembling is only a matter of a few minutes time.

The S K F felt-seal bearing is made to the same high standard of quality that has become synonymous with all S K F marked products and offers outstanding advantages to the machine manufacturer. The bearing is available in sizes that are applicable to a wide range of small mechanical equipment, such as fractional horsepower and small motors, portable tools, and other light equipment.

Industrial Movie Talks About Wire Rope

One of the first successful "talkie" industrial motion pictures has been produced by the American Steel & Wire Company, a subsidiary of the United States Steel Corporation.

Featuring a trip through the mills in which wire rope is made, the entire process becomes not only visible on the silver screen but the illusion of actually being present is increased by the introduction of sound.

As each stage of manufacture is viewed, it is orally explained in a detailed and impressive manner. In this way many important points of interest, impossible to cover in the usual screen captions, are conveyed to the listener.

An added and novel feature is the use of lively music at certain spots where

the action does not require conversation. This combining of entertainment with educational factors has proved unusually effective in maintaining interest to the highest possible pitch.

Although the adaptation of sound to industrial films is new, the remarkable success of this venture foreshadows a widespread use.

Adjustable Pneumatic Brattice Announced by E. D. Bullard Co.

E. D. Bullard Company announce the addition to their line of the Bullard adjustable pneumatic brattice to be used in combating mine fires.

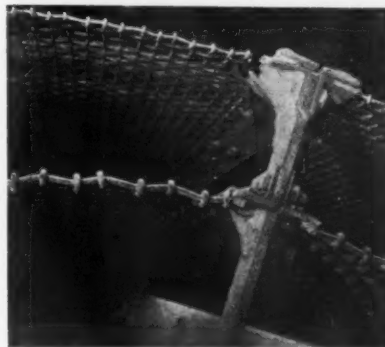
This brattice was developed by V. T. Berner, of the Nevada Consolidated Copper Co., who conceived the idea after years of mine rescue experience. The device is light weight and easily handled, quick and simple to erect and efficient in preventing the passage of air.

Individually constructed brattices, similar in type to the Bullard pneumatic brattice, have been successfully used for years. In each case it was necessary to collect the necessary material, construct the brattice under unfavorable manufacturing conditions, and shoulder a cost probably greatly in excess of what the device should cost under quantity production.

Realizing the need for a standardized pneumatic brattice of this type, E. D. Bullard Company has embodied the best principle in their brattice and now offers it ready to operate.

New Woven-Wire Screens Said to Wear Longer

Spring-steel woven-wire screens are announced as a new development by the Ludlow-Saylor Wire Company, of St. Louis. Spring-steel is a hard, resilient alloy for severe service on revolving-screen jackets, vibrating-screen sections, and shaking and gravity screening surfaces, and screens of this material last



several times as long as the same grades made of ordinary steel.

The first installation made four years ago (in 1926) is reported to be still in service. This consists of two cylindrical outside jackets on a revolving screen handling crushed limestone for road ballast. These jackets have been used continuously since their installation, and the operator reports they still look good.

Spring-steel has also been thoroughly tested on all the various types of vibrating screens. On copper ore in Arizona, on lead-zinc ore in Missouri, on by-product coke in New Jersey, on crushed stone and gravel throughout the country.

These new screens have passed the experimental stage, and they can now be furnished in all the grades required for heavy sizing duty.

New Electric Brazing Equipment Uses Resistance Principle

The General Electric Company announces a new line of electric brazing equipment to have wide application in all industries. The method and equipment involved are simple and inexpensive, and have many advantages over other methods of joining metals.

Brazing with this equipment is caused by the heat generated by the flow of electricity through carbon blocks. As these blocks offer high resistance to the flow of electricity, the heat generated is correspondingly high, and but small pressure is needed to complete the joint.

The equipment consists of a transformer, foot switch, and tongs for holding the carbon blocks and work. The sizes of the various parts depend on the size of work to be handled and joints to be made. A typical equipment in-

NEW LOCOMOTIVE OF INTEREST TO THIN-SEAM OPERATORS

This issue of MINING CONGRESS JOURNAL contains an announcement of a low-type storage-battery locomotive which also will soon be made in permissible type. This telescopic-type locomotive has a removable battery, thereby permitting changing the battery when one is exhausted.

The Mancha Storage Battery Locomotive Company, of St. Louis, has built storage-battery locomotives for years, and they have frankly stated on several occasions that during the past two years their sale of low-type storage-battery locomotives has been virtually wiped out, due to the number of thin-seam mines that have closed.

This newest locomotive which they are placing upon the market indicates that they believe the remaining thin-seam mines are sufficiently well entrenched to assure their staying in business for some time to come, and indicating also that they believe that many of these thin-seam mines are going to encounter gas which will require permissible equipment.

It is impossible to tell at this time whether the Mancha Company is right in their prognostication. Time alone will tell; but they are at least to be commended for the vigorous and forceful way in which they have backed up their own views.



volves a 5-kv.-a. transformer weighing 45 pounds, having a 220-volt primary and an 8-volt secondary. A 10-kv.-a. transformer for heavier duty weighs 95 pounds, has the same primary taps, and has 8, 10 and 12 volt taps on the secondary. The secondary taps can be readily changed for different sizes of joints, the higher taps being used for larger sections.

The various parts to be brazed are either designed with flat surfaces to begin with or are flattened before brazing. After the work is clamped in the tongs, flux is added and the current is turned on by pressing the foot switch. When the flux melts, the brazing alloy is held against the hot metal until alloy flows into the joint by capillary attraction. During the process of brazing the hot alloy dissolves a thin film of the metal surfaces, thus forming a new alloy rich in copper and with a higher melting point than the original alloy.

Many advantages are claimed for this method over soldering. Less time is required, brazing is less expensive, and the conductivity, mechanical strength and durability are higher than those of the lead joint.

Caldwell Screw Conveyor Drives Described in New Book

Book No. 1191, illustrating and describing the complete line of Caldwell Screw Conveyor Drives, has just been published by H. W. Caldwell & Son Co., 2410 West Eighteenth Street, Chicago.

The 32 pages of this book are devoted to illustrations of these drives, typical installations of the equipment, and engineering data enabling one to select, without confusion, the most efficient and economical drive for the individual purpose.

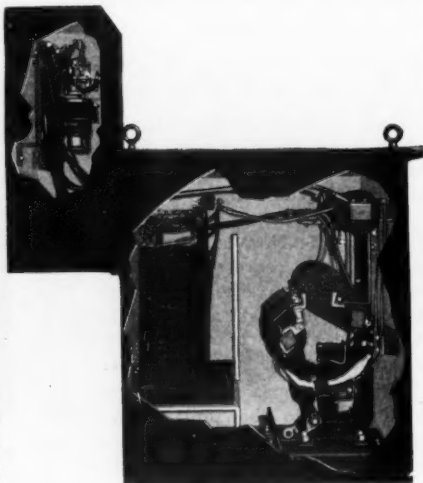
These drives form one of three groups of standardized drives which are carried in stock for prompt shipment. The other two are Caldwell Standardized Drives for Bucket Elevators, and Caldwell Standardized Drives for Belt Conveyors. The drives in the three groups are of the same general construction, but the range of sizes and speeds is adapted in each case to the particular field covered.

New Acetylene Plant in Casper, Wyo.

The Prest-O-Lite Company, Inc., 30 East Forty-second Street, New York, N. Y., has placed in operation a new plant for the manufacture and distribution of dissolved acetylene at Casper, Wyo. The new plant has been built to accommodate the increasing need of users of the oxy-acetylene welding and cutting process in this region. The plant is located on a private siding of the Chicago, Burlington and Quincy Railroad, and the address is 648 Bryan Stock Trail, Casper, Wyo.

New Full Voltage Magnetic Starter

A new 2,300-volt, full-voltage magnetic starter is being built by the Electric Controller & Manufacturing Company, of Cleveland, Ohio. This starter, complete with overload relays and a self-contained potential transformer (to se-



cure 220 volts for the control circuit) is intended for across-the-line starting of squirrel cage and synchronous motors, and may also be used to control the primary of slipring motors. The starter is built for reversing, nonreversing, and plugging applications.

The design of this starter is radically different from the switchboard circuit-breaker type of starter commonly used in the past for full voltage starting of high-voltage a. c. motors. There are no bell cranks, toggle mechanisms, or lever systems between the magnet armature and movable contact arm. The magnet armature, carrying the movable contact arm, is direct acting and is supported by only one large bearing pin and, since the entire unit is totally oil-immersed, all working parts are always well lubricated and protected from dust and corrosion. This insures the equipment is ready for operation at any time, whether it is out of service for a few minutes or for several months.

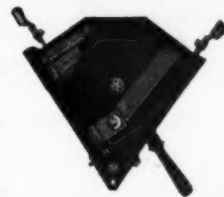
The contacts used on this, the type ZHS full-voltage magnetic starter, are likewise very different from previous 2,300-volt designs. They open and close the circuit with a wiping and rolling action, are duplicate, and are easily renewable.

As illustrated, the enclosing case is a heavy welded steel tank, which houses the completely wired unit. A longer tank, containing two type ZHS magnetic contactors, mounted back to back and mechanically interlocked, is supplied for reversing, nonreversing, and plugging applications. This unit construction provides a flameproof, corrosion-

proof, and dustproof installation that may be mounted anywhere with perfect safety. It is not necessary to build an expensive control room for these starters. Frequently it will prove very economical to mount them out in the plant alongside the motors they control, thereby permitting a very substantial saving in installation costs. It is safe to do this, because all live parts are totally enclosed and grounding the case provides a shockproof installation. The type ZHS full-voltage magnetic starters are available in two sizes, the No. 2 and No. 3 sizes, with maximum ratings of 600 hp. and 1,200 hp., respectively. These starters may be controlled from a type M master switch, which can be arranged to provide low-voltage release or low-voltage protection. The starters may also be controlled from float switches, pressure regulators, altitude regulators, and similar actuating devices.

New Safety Switch Breaks Heavy Overload Without Danger to Operator

Heavy mining machinery and correspondingly heavy currents are becoming increasingly prominent in mining practice. Danger has always accompanied the operation of breaking a circuit under heavy load with an open type switch. The arc carried by the opening switch frequently burns the hands and face of the man disconnecting the circuit. To disconnect such current and at the same time safeguard both the operator and the switch itself, the Ohio Brass Company, Mansfield, Ohio, has brought out a safety switch in four sizes. Safe breaking of the circuit is accomplished by means of a quick-make, quick-break feature combined with a magnetic blow-out that extinguishes the arc. The operating parts of the switch are fully enclosed in an insulated fire-proof case.



Sectionalizing the mine may readily be accomplished by a number of these safety switches mounted on the ribs and interposed in the various feeder circuits. By means of these switches a branch of the mine may be cut out without affecting the operations in other parts.

Full opening and full closing devices are always assured through the construction of this device, and repeated operation does not damage any part of it. A heavy rubber handle completely insulates the hand from any live parts.

Ample proportioned to operate under their rated loads, the new O-B safety switches are furnished in capacities of 200, 400, 600 and 1,500 amperes.

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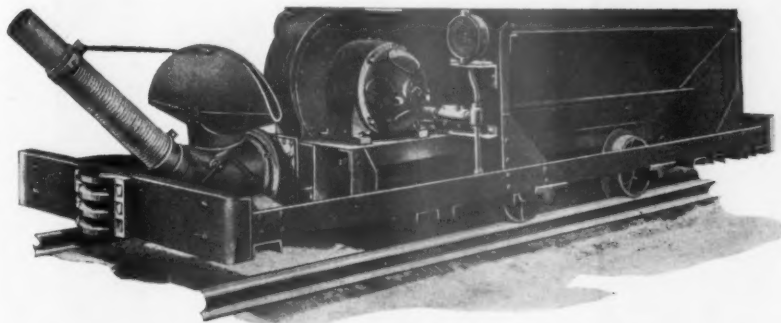
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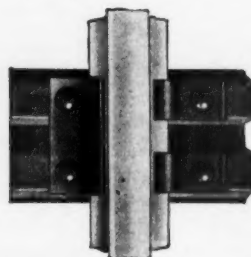


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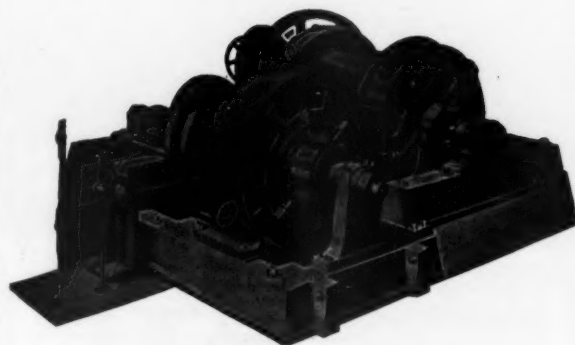
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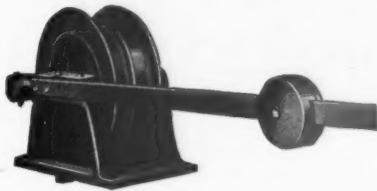
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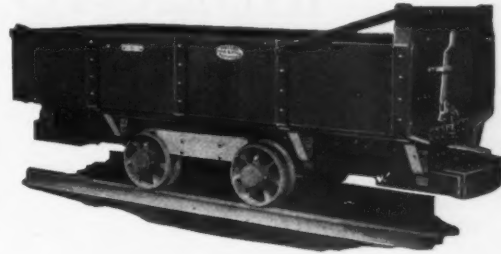
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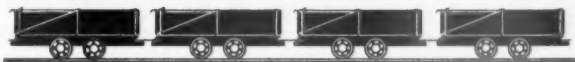
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INDEX TO ADVERTISERS

	Page		Page
Allis-Chalmers Mfg. Co.	14	Joy Mfg. Co.	13
American Mine Door Co.	23	Link-Belt Co.	17
American Steel & Wire Co.	22	Mancha Storage Battery Locomotive Co.	10-11
Ayer & Lord Tie Co.	25	Mine Safety Appliances Co.	24
Bethlehem Steel Co.	6	Morse Chain Co.	Back Cover
C. S. Card Iron Works	27	Mott Core Drilling Co.	28
Carnegie Steel Co.	12	Ohio Brass Co.	8
Connellsville Mfg. & Mine Supply Co., The	24	Pennsylvania Drilling Co.	28
Conveyor Sales Co., Inc.	19	Phelps Dodge Corp.	25
DeLaval Steam Turbine Co.	23	Phillips Mine & Mill Supply Co.	27
Ellis Mills Mfg. Co.	27	Roberts & Schaefer Co.	3
Ensign-Bickford Co., The	Inside Front Cover	Robinson Ventilating Co.	25
Enterprise Wheel & Car Corp.	28	Roebling's Sons Co., John A.	5
Evans, Geo. Watkin	28	Stonehouse Signs, Inc.	28
General Electric Co.	16	Timken Roller Bearing Co.	20
Goodman Mfg. Co.	21	Tyler Co., The W. S.	27
Hockensmith Wheel & Mine Car Co.	18	United Iron Works, Inc.	22
Hoffman Bros.	28	Universal Vibrating Screen Co.	27
Holmes & Bros., Inc., Robt.	25	Wadleigh & Bailey	28
Irvington Smelt. & Ref. Works	25	Webster Mfg. Co., The	27
Jeffrey Mfg. Co., The	7-9	West Virginia Rail Co., The	24
		Westinghouse Elec. & Mfg. Co.	15



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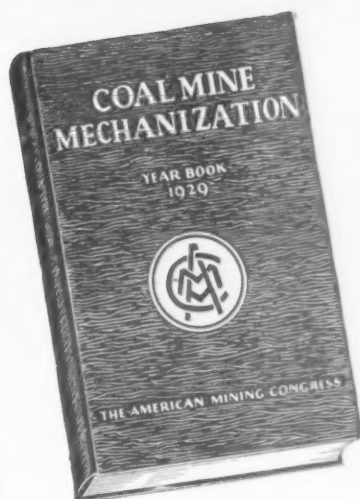
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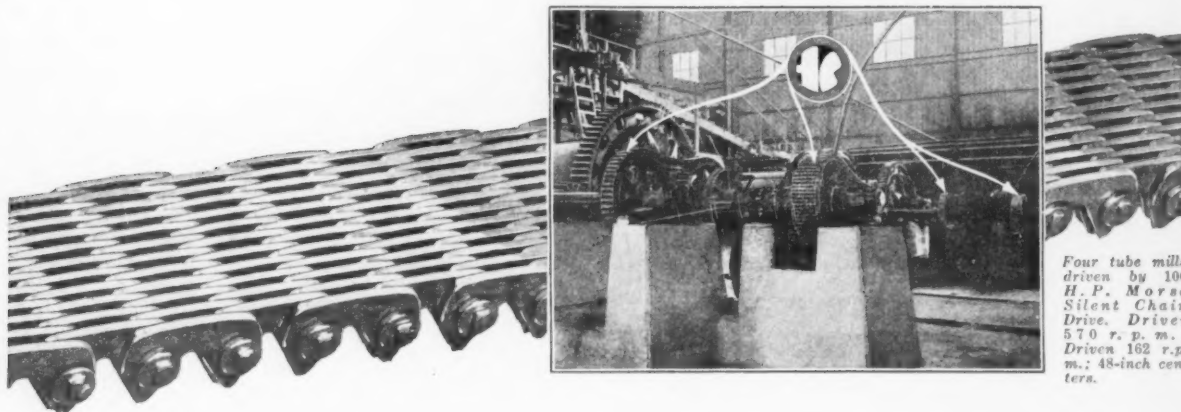
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